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A SYNOPSIS OF STUDIES ON PERITONEAL ADHESIONS WITH A CONTRIBUTION TO THE TREATMENT OF DENUDED BOWEL SURFACES.

By Edward H. Richardson, M. D.,

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It is scarcely necessary nowadays in a consideration of post-operative peritoneal adhesions to include convincing data as to the reality, scope and importance of this surgical problem. All of us know how frequently troublesome adhesions occur as a mortifying post-operative complication, even in our best hospitals and at the hands of our most skilful surgeons. Impressed by several striking instances of this character which have come under my observation during the past few years, I was led recently to undertake a systematic study of the entire available literature upon this subject, in order, if possible, to arrive at some definite conclusions regarding the pathology, the etiology, the prevention and the treatment of peritoneal adhesions. In a later publication I hope to present a complete analytical study of this voluminous material, with detailed references to the original contributions upon which I have based the opinions about to be expressed. It is my purpose in this communication simply to present a brief synopsis of this work in connection with a description of a new method of treating denuded bowel surfaces.

At the outset it is well to recall certain familiar characteristics of the peritoneum itself which have an important bearing upon this subject.

We are apt to forget the enormous area of this serous membrane, which has been estimated to be only slightly less than that of the skin.

Again, its remarkable absorptive power is sufficiently striking to have actuated a large number of investigators to undertake elaborate and laborious researches to determine its mechanism. As a result of this work we now know that fluids and soluble substances are, for the most part, absorbed by the blood vessels, while solid particles—such as coloring matter in suspension, bacteria, oil globules, etc.—are taken up by the lymphatics. Furthermore, that the lymphatic absorption is most active in the upper part of the abdomen, especially on the under surface of the diaphragm, and in the omentum, while in the pelvis it is sluggish—a fact now commonly taken advantage of by surgeons in the use of the Fowler's, or sitting, posture in the treatment of peritoneal infections.

It seems definitely established too that the very sensitive epithelial covering of the peritoneum is continuous, and not perforated by numerous stomata, or direct channels of communication between the peritoneal cavity and the lymphatic vessels, as was until quite recently taught. Closely allied with its absorptive power is its well-known ability to successfully cope with an astonishing amount of infection without itself being seriously or permanently damaged.

Then, too, it is important to remember that different portions of the peritoneum vary very greatly in sensitiveness to pain; in a general way the visceral portion being insensitive, while perhaps no tissue in the body exhibits quite the same exquisite sensitiveness to pain as do the parietal layers of this serous membrane.

Finally, one of its most striking characteristics is the rapidity with which it can form adhesions—a piece of gauze introduced into the abdomen during the course of an operation becoming quite snugly fixed to the visceral surfaces within a period of twenty minutes—a fact that is daily taken practical advantage of by surgeons in the disposition of protective gauzes during operations upon infected areas, and which adds materially to the sense of security afforded by gauze pads alone. This characteristic is also very intimately involved in the whole question of peritoneal drainage, and constitutes further one of nature's admirable methods of protection against peritoneal insult, as exemplified in the walling-off of an appendix abscess.

Perhaps less striking, but to my mind even more remarkable, is the completeness with which the peritoneum may absorb adhesions, and indeed completely eradicate all traces that would indicate their previous existence. From the evidence in hand it would seem to be a perfectly safe assertion to make that adhesions invariably follow laparotomy, yet how common it is nowadays to find no traces of them at a later second laparotomy!

Now obviously, all of these fundamental and important characteristics of the peritoneum, which are familiar to everyone, must be reckoned with in studying the process of adhesion formation, and in any attempt to control or prevent it. Happily we now know, as a result of much careful experimental and clinical study, quite accurately the pathological changes involved. Categorically stated, they are, in order of sequence, injury or death of the endothelium, pouring out of coagulable exudate, agglutination, organization, fibrous tissue formation, and a final termination in a contracted scar. There is a very attractive theory, supported by creditable experimental work, that the permanence or subsequent resolution of adhesions depends upon the fate of the surface endothelium. If the cells are capable of recovering from insult sustained, the process of adhesion formation advances no farther than the stage of agglutination, and later entirely disappears; but if, on the other hand, the injury has been sufficient to effect the death of the endothelium, organization proceeds and the adhesions become permanent. It seems to me, however, that further experimental confirmation is needed before we can accept this view without modification.

In view of the pathology of peritoneal adhesions just outlined, it is not surprising to find the bulk of the literature on their etiology concerned with a study of the various agencies ordinarily coming in contact with the peritoneum that might be considered inimical to the vitality of its endothelium. For the sake of brevity and clearness we may classify these contributions according to subject-matter as follows: (1) Blood; (2) Sutures and Ligatures; (3) Eschar of the Thermo-cautery; (4) Air; (5) Infection; (6) Mechanical, Chemical, and other Agents.

Blood.—The final verdict has not yet been given regarding the relationship of free blood in the peritoneal cavity to adhesion formation. After carefully and impartially weighing the evidence before me, however, and in the light of my own observations, especially in cases of ectopic pregnancy, it is my deliberate judgment that blood alone does not cause peritoneal adhesions. Although frequently associated, the presence of adhesions can always, in my opinion, be more rationally explained in other ways than on the assumption of irritation from the blood.

Sutures and Ligatures.—Much of the older literature has to do with the question as to whether or not aseptic sutures and ligatures constitute an important factor in the production of adhesions. Mass ligatures and pedicle stumps, too, are accorded significant consideration. But while this whole subject of the ultimate fate of the various sutures and ligatures used in the tissues of the peritoneal cavity furnishes a study of absorbing interest, I shall have here to assume familiarity with it, and dismiss the matter with the statement that where one exercises good surgical judgment and manual dexterity in the choice and application of aseptic sutures and ligatures, no grave fears need be entertained as to troublesome adhesions arising from this source.

Eschar of the Thermo-cautery.—The results of the experimental work on the use of the thermo-cautery in the peritoneal cavity have been somewhat conflicting. The reason for this is probably to be found in a fact brought out by some of the later work, namely, that a superficial burning generally gives rise to adhesions, while a deep thorough cauterization with the formation of a thick eschar, does not produce adhesions. The explanation offered is that the charred surface protects the granulating surface beneath from exposure until it becomes covered with new endothelium. However true this may be, the weight of experimental and clinical evidence certainly warrants the thorough application of the cautery when indicated with far less likelihood of adhesions ensuing than if certain other procedures applicable to the same conditions are substituted.

Air.—Exposure of the viscera to the air is recognized, of course, as one of the cardinal factors in the production of surgical shock. It may not be so generally known, however, that much experimental work of the highest order has been done to ascertain the effect of the air on the peritoneal endothelium, and its relation to adhesion formation. Unfortunately, here again the results are conflicting; but the evidence is decidedly in support of the view that the air, even

when freed from dust and infection, does exert a deleterious effect on the endothelium. The most plausible explanation of its action is that rapid absorption of heat and moisture from the peritoneal surfaces occurs, and as a result of this drying and cooling process, a necrosis of the endothelial cells is produced, with resulting contraction of the blood vessels and diminished nutrition, all of which stand in etiological relationship to adhesion formation. Thus, aside from the prevention of shock, we have an additional very important reason for carefully protecting all parts of the peritoneum from undue exposure during the course of abdominal operations.

Infection.—No one doubts, of course, that infection produces adhesions. But there seems to be much difference of opinion as to the formation of adhesions without infection. A number of observers have called attention to the gradual falling off in the number of adhesion cases seen in the clinics corresponding with the improvement in surgical technique. Some have interpreted the remaining incidence, however, as conclusive evidence that our methods are still imperfect as regards asepsis.

The work of the experimental investigators, while admirable in its thoroughness, has unfortunately confused rather than simplified matters, by reason of the conflicting results obtained. No phase of this whole subject has evoked a sharper controversy than the question of infection in its relation to adhesion formation, and the alignment can be sharply drawn between the adherents of two views: (1) those who hold that infection is the sole cause of adhesions; (2) those who hold infection to be the chief cause, but admit that they do result from various other causes acting independently or collectively. The latter group are unquestionably right, as is conclusively proven, not only from a comprehensive study of the whole problem of adhesion formation, but indeed is tacitly admitted by their opponents through the conspicuous absence of any recent substantiation of their claims. No one, as far as I know, is contending nowadays that adhesions can only be produced by infection.

Mechanical, Chemical and other Agents.—Under this heading are to be included nearly all of the various fluids and chemicals formerly so extensively used and constituting the major part of antiseptic surgical technique. All this has been replaced, of course, by our modern aseptic methods, and the experimental as well as the clinical evidence testifies undeniably to a consequent diminution in the number of adhesion cases seen.

Abundant experimental proof is available to support the generally accepted view that raw surfaces, resulting from direct mechanical insult to the peritoneum, are one of the commonest, if not the most frequent, cause of adhesions. So, too, foreign bodies inadvertently left in the abdominal cavity, as well as the various types of drains purposely introduced, invariably provoke adhesions. In this connection too much emphasis cannot be given to the importance of exercising the utmost care and gentleness in all intraperitoneal manipulations. Rough handling of the viscera; unintelligent, and I might say sometimes almost brutal, use of retractors and other instruments; mauling the bowel surface by the introduction of innumerable gauze pads, which, to be sure, add materially to the comfort of the operator, but more to the distress of the patient; the application of dry gauzes to the peritoneal surfaces, which generally adhere, and when removed often bring away with them the surface endothelium; unnecessary sponging, as a sort of surgical tic or habit spasm; careless application of hæmostats, with painful indifference to the mass of crushed tissue left to necrose in the grip of the ligature—all of these constitute transgressions of which few of us can claim innocence. But they also constitute a prolific source of adhesions, and should therefore be constantly borne in mind in order to impress upon us the value and importance of diligently cultivating a healthy aversion to unnecessary trauma, and a profound respect for the tissues.

Coming now to a consideration of the prevention and treatment of adhesions certain prophylactic measures at once suggest themselves as being clearly indicated from what has already been said. Briefly stated these are—rigid asepsis; avoidance of mechanical, chemical or thermic trauma; careful covering up of all raw surfaces; use of hot moist gauze; and avoiding exposure of the peritoneum to the air. Thus far, practically everyone is agreed. But the common experience that troublesome and dangerous adhesions still quite frequently occur, in spite of the strictest possible observance of these measures, has stimulated investigators to undertake the most varied and elaborate researches with the hope of discovering some prophylactic or remedial agent that would prove efficacious in all cases. This work has resulted in the production of many ingenious and valuable procedures, all of which have at one time or another been enthusiastically advocated, and have received varying degrees of support from the profession generally. Most of them have been sufficiently tested now to admit of a pretty accurate opinion being formulated empirically, as to their actual worth. From a study of the numerous reports the following classification and valuation of these heterogeneous devices seems warranted.

1. *Non-Absorbable Protective Membranes.*—Under this caption may be included the covering of raw surfaces with collodion film; gelatin-formalin coagulum; lymph-aristol coagulum; silver foil; solution of gutta-percha in chloroform, carbon bisulphid, or xylol; and thin sheets of silk or rubber fabric.

None of these agencies can be relied upon to furnish more than a small percentage of uniform and successful results, and on this account, cannot be recommended for general use.

2. *Manual and Postural Arrangement of the Viscera.*—This is accomplished partly through proper disposal of the viscera with reference to normal anatomical relationship at the end of the operation, and partly through post-operative posture in the ward, with the double idea of avoiding permanent kinks at those movable parts of the gastro-intestinal canal which commonly produce untoward symptoms—such as the pylorus, upper part of jejunum, lower ileum, cæcum, transverse colon, and sigmoid—and for the further purpose of gravitating the abdominal contents away from raw surfaces. Both of these

procedures seem rational and worthy of more general consideration and use.

3. *Peristalsis.*—Considerable work has been done on the post-operative use of physostigmin, with the idea of stimulating strong peristalsis, and thus liberating early adhesions and preventing their recurrence. Conflicting results have been reported, however, and the routine use of this drug is of doubtful value.

4. *Specific Drugs.*—Iodides have been recommended with the idea that they inhibit proliferation of connective tissue, and aid in its absorption. Thiosinamin, and its combination wth salicylate of sodium, known as fibrolysin, have been accredited with possessing a softening influence upon cicatrices and other abnormal growths of connective tissue.

The use of various anti-fibrin ferments, with the intention of preventing coagulation of exuded serum—the first essential stage in adhesion formation—have been also tested experimentally and recommended. An encouraging increase of success has attended this pioneer work in an effort to apply specific chemo-therapy to the problem of peritoneal adhesions, and further development along this line is to be confidently expected.

5. *Normal salt solution* in large quantity poured into the abdomen at the end of the operation in order to float the loops of bowel into their normal relationship and keep denuded surfaces separated, was at one time extensively used. Later on adrenalin was added, with the idea of preventing exudate through its constricting action on the vessels. But it has been shown that absorption is too rapid to admit of much new growth of endothelium over raw surfaces before they again come into contact with adjacent tissues.

6. *Gases.*—Distention of the abdomen with oxygen gas just prior to closure of the peritoneum has been recently suggested as a useful resuscitating and anti-adhesion measure. So, too, intra-abdominal hyperæmia, brought about by periodic local application of the hot-air bath to the lower trunk has been recently quite warmly advocated.

7. *Eschar of the Thermo-cautery.*—As already indicated, if this measure is utilized, the cauterization should be very thorough, so as to form a deep and lasting charring of the tissues. This measure undoubtedly possesses distinct advantages under certain conditions.

8. *Lubricants.*—Because of their harmlessness, ease of application, and apparent effectiveness in many cases, various oily and fatty substances are perhaps more extensively used than any other single artificial measure in the treatment of adhesions. A number of substances of this kind have been suggested from time to time and carefully studied experimentally; including olive oil, vaseline oil, liquid lanolin, liquid petrolatum, and others. Vaseline oil seems to possess certain advantages, notably the fact that irritating fatty acids are not so readily split off from it during the process of sterilization, as is the case with olive oil. The sterilization should be carefully done, and the temperature not carried too high for this reason.

9. *Non-Viable Animal Membranes.*—Cargyle membrane, made from the peritoneum of the ox; a similar membrane from the shark's peritoneum; goldbeaters' skin, derived from the outer coat of the cæcum of the ox; and a fine woven cloth made of catgut, constitute the members of this group. Cargyle membrane has been more extensively used than any of these, but in the hands of some investigators it has given miserable results, and even its most enthusiastic advocates admit its failure in a number of instances. Theoretically, it is surprising that these membranes do not uniformly provoke, rather than prevent adhesions—and there is considerable experimental evidence in support of this view—inasmuch as a piece of dead animal tissue that has been kept in preservative fluids, although it may later undergo absorption, is in every sense of the word, a true foreign body while it remains in the peritoneal cavity, and must be so regarded in its relations to adhesion formation. It seems to me inevitable, therefore, that these substances will gradually fall into disuse.

10. *Viable Grafts.*—Much more rational are the efforts to cover raw surfaces by plastic operations on the peritoneum, or by autogenous grafts of omentum. It has been shown experimentally that if the entire omentum of dogs be amputated and simply dropped into the peritoneal cavity, it does not undergo necrosis, but on the contrary, quickly becomes spread out over the parietal peritoneum, to which it adheres, and promptly becomes vascularized.

Furthermore, it has been shown that omental grafts applied to denuded bowel surface establish sufficient vascular communication to admit of injection from the aorta with aniline fluids within the surprisingly short period of twenty-four hours. Again, no one has reported, as far as I know, an instance of necrosis of an omental graft. But unfortunately they do not prevent adhesions, except when applied to the abdominal parietes and to organs possessing strong peristalsis, such as the stomach and urinary bladder. On the small bowel they are very useful in reinforcing weak points and suture lines, but here they invariably adhere to neighboring loops.

It is evident, therefore, that grafts of fresh omentum and peritoneum have a very important and wide field of application, and it seems quite feasible to have at hand in the operating room, just prior to operations upon bad adhesion cases, an abundant supply of peritoneum obtained from a freshly slaughtered calf, under aseptic conditions, and carefully guarded from mechanical or chemical trauma, for extensive application.

A New Method of Treating Raw Bowel Surfaces.

A few months ago during the course of an operation for the relief of an enormous post-operative ventral hernia a situation arose which suggested to me a new, and what I believe to be an eminently satisfactory method of dealing with denuded bowel surface under certain conditions. The patient was a very large, fat woman, well past middle life, who, by reason of circulatory and renal disease, was rather a poor surgical risk. Moreover, about six months previously she had undergone a very serious operation for radical removal of the generative organs on account of a moderately advanced cancer

of the uterine cervix, at which time the abdominal wound had evidently become infected and broken down with a resulting hernia. Occupying the hernial sac, besides a bulky omentum densely adherent throughout, there was a long loop of ileum, coiled in a horse-shoe fashion, each limb of which had become so intimately adherent to the peritoneal lining of the sac as to render separation along any definite line of cleavage impossible. The two limbs were also adherent to each other by several transverse bands of dense fibrous tissue. After effecting the release of the intestine I had, therefore, two extensive raw areas, each measuring two to three inches in length, involving nearly one-half the circumference of the bowel, and separated from each other by six or eight inches of practically normal intestine.

Another factor of great surgical importance was the extensive dissection necessary to cure the hernia, by reason of the wide separation of the recti muscles, the enormous size of the opening, the abundant scar tissue produced by the old

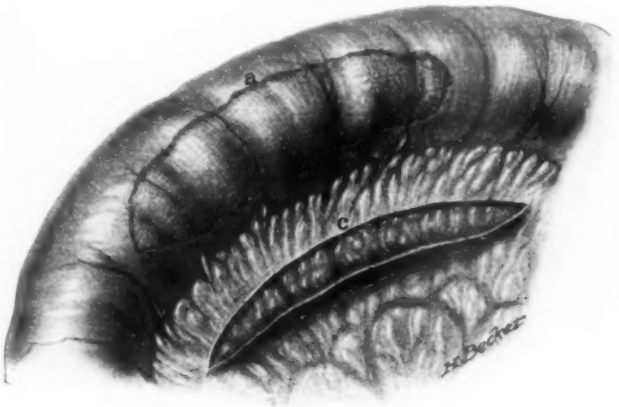

FIG. 1.—An extensive denuded area on the surface of the ileum is here shown. Observe that at its widest portion *a-b* it involves nearly one-half of the circumference of the bowel. The liberal deposit of fat in the mesentery here represented admits of the ready separation of its two peritoneal leaves. Note that the incision for this purpose through the upper leaf is made about 1 cm. from its bowel attachment, in order to avoid the numerous branching vessels in this region. The separation of the flap *d* is now easily and safely effected to any desired extent, since the average width of the mesentery is eight inches. A flat, blunt instrument—a spatula, for example—is best suited for this step. The rich vascular anastomosis between the mesenteric leaves, afforded by the superimposed colonnade arrangement of the trunk vessels, is easily seen.

infection, and the atrophy and impaired vascularity of the tissues to be utilized in effecting the closure. These unfortunate circumstances, together with the patient's general condition, made it highly important that all possibility of wound infection should be scrupulously avoided, as well as that every possible precaution should be taken against the occurrence of intestinal obstruction, which might necessitate the undoing of all my work. Now, recalling the condition of the bowel surface just described, it is evident, upon consideration, that none of the customary methods of dealing with this complication were applicable to the conditions in hand. I could not, for example, invert the raw surfaces, because of their extent and proximity to each other—obstruction would almost certainly have ensued. The various other measures already described were either impracticable or too unreliable, in view of the serious consequences of failure. I did not dare resort to lateral anastomosis, because I was dealing with the lower ileum; and while this procedure would have taken care of the raw surfaces and obviated the danger of obstruction, it would at the same time have afforded an excellent opportunity for infection of the devitalized tissues of the wound, with complete destruction of all my plastic work, and immediate recurrence of the hernia. Fortunately, the problem was practically solved for me by the accidental laceration and partial retraction of one leaflet of the mesenteric peritoneum just along its line of attachment to the bowel and adjacent to one of the raw areas on the surface of the latter, which occurred during its separation from the hernial sac (Fig. 1). There being a considerable deposit of fat between the two layers of

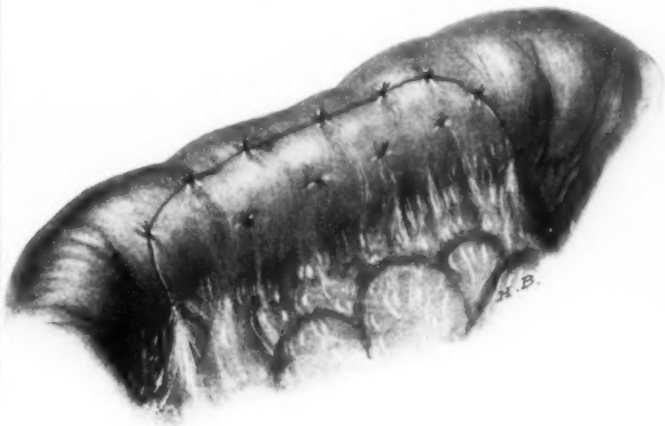

FIG. 2.—The detached flap of peritoneum is here shown drawn up over the raw bowel surface and firmly fixed by interrupted sutures of fine silk. Note how completely and satisfactorily the defect has been remedied. Observe too, that, owing to the mobility of both the bowel and its mesentery, the mechanical effect on the bowel lumen and the mesenteric circulation is negligible, and cannot produce any serious consequences. Care must be taken to close the angles of the mesenteric flap just at the bowel margin, as shown, to avoid the possibility of an intra-mesenteric hernia.

mesenteric peritoneum, it was a surprisingly simple and easy procedure to extend the separation of the torn leaflet and its attached fat in all directions from the underlying vessels and the opposite intact leaflet with its fat, thus obtaining a large movable flap of normal peritoneum which was easily drawn up without tension, spread out over the raw surface on the bowel, and tacked down with a few fine silk sutures (Fig. 2). The result was eminently satisfactory in every way, this very simple device, which was quickly carried out, having sufficed to abolish a rather complex and embarrassing surgical situation. The patient's recovery was complete and she is now comfortable and happy.

This fortunate experience led me to investigate the idea

further in order to determine accurately its limitations and to meet certain theoretical objections.

Thus it was desirable to ascertain if the method could be applied to all portions of the intestinal tract; if the separation of the two peritoneal leaves of the mesentery could be rapidly effected, without injury to the vessels in poorly nourished individuals whose mesentery usually contains very little fat; and if not, to consider the feasibility of lifting a fold of both leaves of the mesentery, without incising either, over the raw surfaces, thus effecting practically a plication of the mesentery—a modification of the method that would make it applicable to these cases also (Fig. 4); to determine further what effect this axial rotation, or partial envelopment of the bowel within its own mesentery, would have on the caliber and direction of the lumen, with reference to obstruction; to investigate to what extent it would be practicable to so treat

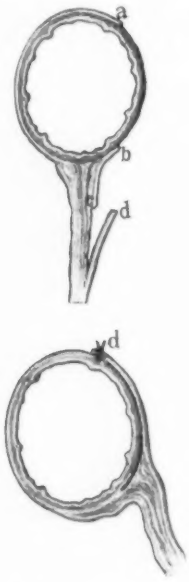

FIG. 3.—The bowel and its mesentery are here represented in cross-section. In the upper drawing, the area between *a* and *b* is the raw surface; *c* marks the point of incision through one peritoneal leaf of the mesentery; and *d* the flap to be freed and drawn up. The lower drawing shows the flap *d* closely applied over the denuded area, and fixed by sutures which should penetrate the submucosa.

the bowel, and to ascertain particularly what effect was produced on the mesenteric and bowel circulation by this mechanical alteration of normal conditions; and finally, how much tension the leaflet of mesenteric peritoneum is capable of withstanding, with reference to its being torn loose by postoperative distention or vigorous peristalsis.

The fresh cadaver seemed to offer the best method of settling these questions, and my conclusions, based upon such a study, are as follows:

1. The procedure is best applicable to that portion of the intestinal tract where, in such cases as the one described, present methods are inadequate, namely, from the upper jejunum to the lower ileum. It may be rationally applied, however, to any portion of the bowel possessing a mesentery of sufficient length to admit of its ready execution.

2. Care must be exercised at the duodenum, upper jejunum, and lower ileum not to produce kinks of the bowel.

3. In cases exhibiting a scanty deposit of fat in the mesentery, plication is a rapid, safe and efficient substitute for separation of the two peritoneal leaves.

4. Aside from a slight spiral rotation, which in view of peristalsis and the mobility of the parts is entirely insufficient to produce obstruction, the procedure has no demonstrable effect on the bowel lumen.

5. It can be safely extended to include nearly one-half the circumference of the bowel and three to four inches in continuity. There is no apparent reason why it should not be repeated as often as necessary at different levels of the intestinal tract.

6. In view of the rich vascular anastomosis and the mobility of both the bowel and its mesentery, if care be exercised in placing the sutures so as to avoid the trunk vessels, the effect upon the circulation is negligible.

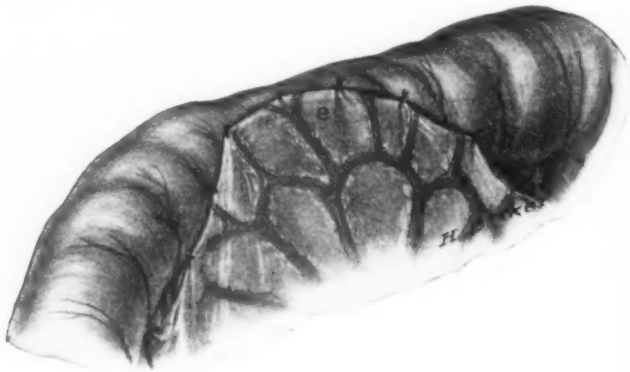

FIG. 4.—The plication modification of the method is here shown. Owing to an almost total absence of fat between the peritoneal leaves of the mesentery in some cases, it is unsafe and impracticable to attempt their separation. In such cases *neither leaf is incised, or separated from its bowel attachment*, but both leaves are grasped together at the proper distance from the bowel border, lifted over the raw surface and fixed by silk sutures. It amounts to a plication of the mesentery, or a partial envelopment of the bowel within both layers of its mesentery. Note that care has been taken to place the sutures between the vascular trunks. This simple modification renders the method applicable to all cases, is even more quickly executed, and is eminently safe and satisfactory.

7. Stability and permanence of the coaptation is readily secured through intelligent disposition of the sutures.

SUMMARY.

Certain anatomical and physiological characteristics of the peritoneum have an important bearing on the problem of peritoneal adhesions. Notably its area, its absorptive power, the variable sensitiveness to pain of different portions, the continuity of its epithelial surface, the rapidity with which it can form adhesions, and the completeness with which it can later absorb them.

Injury or death of the highly vulnerable surface endothelium is sufficient to set in motion the chain of pathological events which terminates in dense adhesions with scar tissue formation.

Etiologically there are a number and variety of factors involved, but they can all be grouped under the two heads, *Sepsis* and *Trauma*.

As prophylactic and curative measures, emphasis should be given to rigid asepsis, the use of moist hot gauze, careful covering of all raw surfaces, avoiding unnecessary exposure, restricting trauma and spreading out of the omentum over the visceral surfaces before closing the abdomen.

A number of additional safeguards are available which have been tested and proven to be of value under certain conditions: the most valuable of these for general use are lubricants, viable grafts of peritoneum, or omentum and judicious ante- and post-operative therapy.

The field of specific chemo-therapy offers the brightest hopes for future progress.

In properly selected cases the use of adjacent mesentery for covering raw bowel surfaces possesses distinct advantages over all methods hitherto proposed.

I desire to express my thanks to the pathological department of The Johns Hopkins Hospital for giving me the opportunity of testing, on the fresh cadaver, the method above described.

PRIMARY CARCINOMA OF THE PLEURA.

By T. P. SPRUNT, M. D.,
Instructor in Pathology, The Johns Hopkins University.

The primary malignant tumors of the pleura, although rare, have considerable interest for the clinician on account of the difficulty encountered in attempting an accurate differential diagnosis. They have their principal interest, however, from the point of view of their pathology; and not only does this interest attach to the question of histogenesis but to their ultimate nature and origin. Doubts have been expressed as to whether we are dealing here with a true tumor in the narrower sense of that term or whether the lesion may not be the result of the chronic inflammatory process which so uniformly accompanies it.

The classical pleural tumor was first described by Wagner and later by his pupil Schulz, and called by them endothelial cancer. The pleura was much thickened and somewhat roughened, resembling the appearance seen in the mucosa of the bladder with prominent, hypertrophic musculature. Histologically the growth in the thickened pleural tissues consisted of numerous alveolar and tubular structures separated from each other by a connective tissue stroma and filled with large epithelial-like cells. They considered the endothelium of the lymph vessels the point of origin of the growth.

A number of cases have since been reported. Glockner, in 1897, collected 42 cases from the literature and added 7 of his own. Gutmann, in 1903, found 9 additional cases. In 1905 Bloch collected 47 endotheliomata and 16 sarcomata.

The individual authors, as a rule, compare their cases with the classical Wagnerian tumor which most of them closely resemble. The tubules and alveoli are sometimes filled with cells, at other times the spaces are lined by cubical or cylindrical cells in one or many layers. Practically all agree that the cells strongly resemble epithelial cells and that the histological picture is that of carcinoma, but the great diversity of opinion as to the nature of the affection may be easily appreciated after a mere enumeration of the names, which have been given it. Among these designations we may mention that of endothelial cancer (Schulz, Wagner, *et al.*), lymphangitis prolifera (Fraenkel, Schweninger), lymphangitis carcinomatodes (Neelsen), sarcocarcinoma (Boehme), alveolar endothelial sarcoma (Padock), endothelioma (Eppinger and many others), carcinoma (Lepine, Pitt, Benda, Dreesen, Ribbert, Orth).

In most of these reports the lining membrane of the pleura was either entirely lost or its cells, if present, only slightly changed. The great majority of the authors refer the point of origin of the tumors to the endothelial lining of the lymphatics.

Benda reports a case in which the principal growth occurred on the pleural surface which was covered with numerous villi. The picture reminded him of the formation of papilli in certain ovarian cystomata. These villi were covered by cylindrical cells and possessed a stroma of connective tissue and blood vessels or occasionally granulation tissue. In the depth, there were many alveoli and strands of epithelial cells or else glandular formations and even small cysts which occasionally showed papillomatous projections from their walls. He considers as true epithelium the cells covering the pleura and his tumor, therefore, as a true carcinoma. He could come to no decided opinion as to the participation of the lymph vessel endothelium, but was inclined to regard the tumor masses in the subpleural tissues as extensions downward from the growth on the pleural surface.

Dreesen reports a similar case and reaches similar conclusions. They are both of the opinion that many of the reported cases had a like origin.

In connection with tumors of the serous surfaces there has been much discussion concerning the embryological development of the serous lining membranes, and concerning the classification of their cells. In the older literature the term endothelium is used almost exclusively, but in recent years many authors consider these cells more closely allied to epithelial structures than to the endothelium and consequently prefer to speak of them as epithelium. Malignant tumors aris-

ing from these cells therefore, they say, should be called carcinomata.

It is now generally held that in their embryology these cells have nothing in common with the endothelial lining cells of the blood and lymph vascular systems. In addition, it has been shown that in certain of the lower vertebrates, the body cavity originates as an invagination of the hypoblast, but there is no sign of such an invagination in the higher vertebrates, in which the body cavities seem to originate by a splitting of the mesoblast with subsequently a differentiation of some of its cells into a lining membrane.

From studies of their behavior under pathological conditions, Mönckeberg, Büttner, Hinsberg, Herxheimer, v. Brunn, and others conclude that the lining cells of the body cavities have more in common with epithelium than with endothelium and the connective tissues. Opposite opinions are expressed by Ranvier, Roloff, and others who conducted somewhat similar experiments. Beitzke, Orth, and Ribbert among other eminent pathologists speak for their epithelial nature.

If then we choose to speak of these cells as epithelium we must regard them as epithelial cells of mesoblastic origin, and related in this respect to the epithelium of the adrenals, kidneys and other organs of the urogenital tract including perhaps that of the uterus and vagina. Most classifications of tumors leave those arising from these organs in a sad state of disorder and it is especially in tumors of this type that Adami's classification seems superior.

In a recent article on pleural tumors Ribbert gives his opinion that the so-called endotheliomata of the pleura are not derived from the endothelium of the lymph vessels, but either from the surface epithelial cells or from misplaced epithelium, and that they should be termed carcinomata. However, he says that such an origin has not yet been proved beyond doubt in a single case, since sufficiently early stages have not been observed.

The tumor described in this report can hardly be regarded in any other way than having arisen from the epithelial lining of the pleura. Its histology in no way resembles that of the classical "endothelial cancer," and it has many points of departure from those described by Benda and Dreesen.

Clinical History.—Mrs. ——, a white woman, was a private patient of Dr. Thomas R. Brown, to whom the author is indebted for the clinical notes.

She was admitted to the Church Home and Infirmary, March 22, 1910, about two and a half weeks after the onset of her terminal illness, with extreme pain in the left chest and abdomen, some nausea and vomiting, and persistent cough.

Of interest in the *family history* is the fact that her mother died of carcinoma of the uterus.

In the past the patient had been strong and well physically, but, married to a confirmed drunkard, she had been subject to great nervous strain and at times was the victim of physical violence. A few years before the onset of the present illness a laparotomy had been performed by Dr. H. A. Kelly and the appendix, right tube and ovary removed. Examination of the specimens showed a chronic inflammatory process, but no evidence of neoplasm.

When she entered the hospital the physical signs were typical of a pleural effusion on the left side. The heart was pushed over to the right parasternal line. The point of maximal impulse was difficult to determine, but there was a distinct impulse half way between the parasternal and sidesternal lines on the left side. The whole of the left chest showed absolute flatness and loss of vocal fremitus. The breath sounds were absent over this area except in the upper left front, where they were distant, harsh and of broncho-vesicular type.

The spleen was palpable. The liver, also, was readily felt, but perfectly smooth and not tender on pressure.

No tubercle bacilli could be found in the sputum. The urine, stools and stomach contents were normal. Rectal examination revealed nothing abnormal. The blood count showed 27,000 leucocytes and 3,500,000 red blood cells.

The left thorax was tapped 14 times and an average of a little over 2000 cc. of fluid aspirated each time. In all 28,270 cc. were removed: the largest amount aspirated at any one time was 3150 cc. The fluid was always gelatinous, varied in color from a pinkish-straw to cherry red, and occasionally contained small bits of fibrin. There was between 1 per cent and 2 per cent of red blood cells and many leucocytes with a great preponderance of neutrophiles. No cells nor fragments suggesting a new growth were observed. Cultures from the fluid remained sterile and stained smears showed no organisms. Inoculation of a guinea pig also proved negative.

The relief after each tapping was slight and lasted only a short while. On each occasion there was a remarkable shifting of the heart's position from 4 to 6 cm. without any change in the pulse rate.

During the first month in the hospital, the temperature and pulse curves were about normal. The temperature during the last 3 weeks was intermittent, from 97° F. to 102° F. or 104° F. and the pulse varied from 100 to 130. The pain in the chest and dyspnœa were often very distressing and there occurred at intervals marked abdominal symptoms, as nausea, vomiting and pain. Cough was never a prominent feature and there was little sputum. On one occasion shortly after tapping a small quantity of bright red blood was expectorated.

The subjective symptoms increased in severity and less and less relief was experienced after the tappings which occurred at more frequent intervals. The patient died apparently from asthenia *ten weeks* after the appearance of the first symptoms.

The physical signs of extreme pleural effusion, the hemorrhagic character of the exudate, the lack of relief after aspiration, the rapid reaccumulation of the fluid, the negative bacteriological tests and the progressive cachexia led to the clinical diagnosis of malignant growth of the left pleura. Whether the growth was primary or secondary could not be determined.

The autopsy (J. H. U. Path. Lab., 3386) was performed two hours after death.

Anatomical Diagnosis.—Primary carcinoma of left pleura; extension to left lung and bronchial lymph nodes; serofibrinous pleuritis (left); total atelectasis of left lung; hydropericardium; right hydrothorax; hypostatic œdema and congestion of right lung with some atelectasis of lower lobe; thrombosis of uterine plexus; pulmonary emboli; chronic passive congestion of spleen; fatty degeneration of heart muscle and liver; anemia; cachexia; scar of old laparotomy (right salpingo-oöphorectomy and appendectomy); chronic pelvic peritonitis with adhesions to sigmoid and ileum; dilatation of stomach and duodenum.

The body is that of a well-nourished white woman. The skin is of a lemon-yellow color, especially marked over the face and hands. The mucous membrances and finger nails are decidedly pale. The muscles are flabby. There are no glandular enlargements in the neck, axillæ or inguinal regions. The breasts are symmetrical, are not pendulous, there is no great excess of fat, no lumps, or any demonstrable abnormality. There is a linear median scar in the lower part of the abdomen. The fat of the abdominal wall is about 1 cm. in thickness and has an orange color. The peritoneal surfaces are normal; there is no free fluid. The stomach and duodenum are greatly dilated. The liver extends about 5 cm. below the costal margin in the right mammillary line and to a point about 4 cm. above the umbilicus in the median line. The diaphragm on the left side has been pushed down until its abdominal surface is convex instead of showing the usual dome-like concavity. On the right the diaphragm reaches the fifth rib. Its peritoneal surfaces are smooth on both sides. The mesenteric lymph nodes are not enlarged. About two feet above the ileocæcal valve a loop of the ileum descends into the pelvis and is adherent to the posterior wall of the uterus. A loop of the sigmoid flexure is also adherent to an inflammatory mass around the left ovary.

Thorax: On removing the sternum there is a gush of turbid, straw-colored fluid from the left pleural cavity which is filled with this material. The right pleura contains about one litre of slightly cloudy fluid. The pericardium also shows a considerable excess of fluid. Its surfaces are smooth, although the parietal wall seems somewhat thickened.

The heart, which was displaced to the right, weighs 250 grams. There is a slight excess of lemon-colored, subepicardial fat, and on tangential section the muscle is slightly mottled with yellowish specks.

Lungs: The right lung is entirely free from adhesions. Its surfaces are smooth and glistening. The upper and middle lobes are slightly moist and show a moderate grade of compensatory emphysema. The tissues of the lower lobe are distinctly more moist and more congested and show in addition partial atelectasis. The small arteries contain reddish, friable thrombi which protrude from the lumen on the cut surface.

The left pleural cavity is filled with several litres of cloudy fluid in which float strands and filmy sheets of a very friable material. This substance lines the whole pleural cavity in veil-like layers, is quite soft, of a pinkish-gray color and can be easily scraped off with the fingers. When this is removed from the parietal wall a harder tissue is revealed which is roughened by small, thickly set nodules about the size of a pea and smaller. This appearance is especially striking on the parietal pleura opposite the third, fourth, fifth and sixth ribs.

The lung is reduced to a fusiform swelling along the left side of the mediastinal tissues and projecting only about 3 cm. into the pleural cavity. It is covered by the friable shreddy material already described. On incision of the lung there is found immediately beneath the fibrinous exudate a thin, apparently fibrous layer. Beneath this the lung substance is green in color, completely collapsed and airless with small black specks scattered throughout. Here and there appear elevated nodules of a bluish-white tissue. These nodules are about 1 cm. in diameter, but occasionally fuse into larger areas measuring 2½ cm. All of them are superficial and near the pleural surface. They are flecked with numerous, yellow and black specks. The left side of the diaphragm shows also the upper surface of fibrinous material, a layer of white tissue measuring about 2 or 3 cm. in thickness, beneath which is a very pale muscle layer 5 mm. thick and showing here and there white streaks. The costal pleura is easily stripped off in some places, but in others is quite firmly bound to the thoracic wall. Section through the nodular area already mentioned shows that some of these nodules are 1 cm. in thickness, of a bluish-white color, firm consistence, with many tiny, opaque, yellow and yellowish-white flecks. The bronchial and peritracheal lymph nodes are enlarged and black. The surface of a few of those nearest the diseased pleura is covered by a rather thick bluish-white layer which extends down into the lymphatic tissue. The trachea and bronchi are somewhat congested, but are otherwise normal.

The axillary lymph nodes on the left side are not enlarged nor of increased consistence. Incision through the breast tissue shows nothing abnormal.

The œsophagus and aorta are normal.

The spleen is enlarged, weighing 250 grams. The surface is dark purplish-gray in color. The organ is very firm with a dark purple, smooth, cut surface.

The stomach and duodenum are considerably dilated and their mucosa digested, but otherwise the gastro-intestinal canal shows nothing remarkable.

The liver weighs 1400 grams, measuring 26 x 19 x 10 cm. Multiple sections show nothing unusual.

The pancreas, adrenals and kidneys are practically normal, although somewhat pale.

Pelvic Organs: The rectum is normal. The left uterine appendages are bound together and to the posterior wall of Douglass' pouch by old fibrous adhesions. The right appendages and appendix had been removed at operation. All the radicles of the venous plexus on each side of the cervix uteri contain cylindrical, reddish, friable casts. The retroperitoneal lymph nodes are somewhat enlarged, pink in color and slightly increased in consistence.

The neck organs and brain were not examined.

Microscopical Notes.—Sections through the nodular portion of the costal pleura show the subpleural tissues thickened and infiltrated with small round cells (Figs. 1-4). The nodules described in gross show the histological appearance typical of carcinoma. There are very rarely any tumor cells in the subpleural tissues, but toward the pleural cavity there extend up numerous finger-like projections having a stroma like that of the sub-pleural tissues and covered by a single layer of columnar epithelium. These processes anastomose quite freely, and in this way form spaces of various sizes and shapes which are lined by one or more layers of columnar cells. Between the nodules the pleural membrane is preserved in many places. The cells show various stages of proliferation. For the most part the cells are columnar in shape, and there are frequent small villi covering the pleural surface (Figs. 3-4). Occasionally the pleural lining is straight and regular consisting of cubical cells (Figs. 1-2), or even flat cells having much the appearance of the normal lining cell (Fig. 6). The transitions may be traced from this regular arrangement to the complicated papillomatous nodules already described. Not only is the pleural surface covered with many villous projections, but these occur regularly in the cyst-like spaces of the larger tumor nodules giving the picture of an intracystic papilloma (Figs. 1, 3, 4, 5).

Near the base of these nodules this cystic and papillomatous structure is most marked. The cells are of a high columnar type with large vesicular nuclei (Fig. 6). Usually there is a single layer, but at times they are piled up several cells thick. In the more superficial parts of the tumor, the papillomatous projections are less marked, and the spaces are being filled up by proliferation of the epithelial cells (Fig. 7), so that here and there they appear as solid strands of epithelial cells, separated by narrow bands of stroma giving the typical appearance of carcinoma simplex (Fig. 8). The free surface of the tumor is covered by a thick layer of fibrin and leucocytes with many red blood cells. Below this there is a very cellular granulation tissue which forms the stroma for the more superficial parts of the tumor. Occasionally the tumor is seen beneath the former line

of the pleura in the subpleural tissue. Here it takes the form of a small cyst-like structure with papillomatous projections into its cavity (Fig. 4). These are lined with quite regular high, columnar epithelium. Similar structures are found occasionally in the fibrous layer over the diaphragm. The muscle of the diaphragm is infiltrated with the elements of the acute inflammation, is quite œdematous, but shows no infiltration by the tumor.

Sections through the lung and visceral pleura show on its surface an acute inflammatory exudate and beneath this a thick layer of granulation tissue (Fig. 9). There is no sign of the original pleural lining. Along the superficial surface of the lung there are masses of the tumor quite similar to the areas already described, appearing as larger or smaller cystic structures with papillomatous lining (Fig. 11). Many of the larger ones show granular necrotic contents. The tumor cells like those on the costal pleura are cylindrical with vesicular nuclei and fairly regular appearance, although here and there several layers are seen and an occasional dark, irregular nucleus. Dipping down into the atelectatic lung there are larger tumor nodules which have a somewhat different appearance. These have much the same general arrangement with thin, anastomosing strands of stroma lined by columnar cells of irregular shape and size, giving a much more malignant appearance (Figs. 9, 11, 12). There is no sharply defined line between these tumor masses and the lung tissue, but little tongues of the tumor extend in between the tissues of the collapsed lung in a definitely invasive manner (Fig. 12.) The bronchi within the lung seem quite regular and normal.

In other sections of the visceral pleura and lung, instead of the large areas along the former pleural line there are small spaces from 15 to 30 microns in diameter lined by similar cylindrical or cubical cells (Fig. 9, 10). In these sections the portion of the tumor invading the lung resembles those already described.

Left bronchial gland: The metastasis here is quite similar to those in the lungs—the cells, however, are not quite so irregular in appearance, and there is more of a tendency in proliferating to fill up the alveolar space, forming solid strands of epithelial cells. The basement membranes of the gland-like structures are very indefinite (Fig. 13).

Other lymph nodes, mesenteric, axillary, retroperitoneal and higher peritracheal nodes show no metastases.

Mitotic figures are rarely seen in the more typical papillomatous areas at the base of the parietal nodules and on the surface of the lung. They are readily found in the more superficial portions of the nodules and are quite numerous in the extensions into the lung tissue.

In summary we have a large number of nodules on the parietal pleura consisting of a papillomatous growth with cylindrical cells covering the connective tissue strands. At the edge of such nodules we find villi projecting from the pleural surface forming a transitional stage between the more conspicuous growth and the flat pleural surface. Selective stains show the usual layer of elastic tissue beneath the pleura, although the fibers are much stretched and quite atrophic. This gives additional evidence, if any is needed, that the membrane in question is really the serous covering of the pleura. Just below the line of the pleura there occur occasionally small, cyst-like structures resembling the basal portion of the surface nodules. These are found in other parts of the parietal pleura, which do not show the lining membrane, and along the surface of the lung. In close association with these regular, adenomatous areas begin the extensions into the lung substance, which have a less typical histological appearance (adeno-carcinoma) and show definitely invasive growth in the deeper portions.

The objection may be raised that such a picture might be afforded by the extension of a bronchial cancer to the pleura. This view has been given careful attention. All the evidence is in favor of a primary pleural tumor extending into the lung. There is none favoring a bronchial origin. In many sections from different blocks the bronchi seem perfectly normal. The portions of the tumor within the lung are, as a rule, triangular in shape with the base at the surface and apex in the depth. All are in direct connection with the growth on the surface of the lung and transitions from the adenomatous tumor on the surface to the adeno-carcinoma within the lung are evident in most of the sections. The cells at the apices of the lung nodules lose their gland-like arrangement and infiltrate the atelectatic lung as solid, slender strands of epithelial cells.

We may reach the conclusion that we have a tumor, whose cells are in general atypical, arising from epithelium of mesoblastic origin. However, it retains throughout its epithelial nature, never reverting to the connective tissue type. If we adopt Adami's phraseology, we should speak of it as a transitional lepidoma or a mesothelial carcinoma, since it arises from what he calls a transitional lining membrane or epithelium of mesoblastic origin.

Since it varies so markedly from other reported pleural tumors, we are not justified in making any broad generalizations. We should expect tumors of such origin to show many variations.

EXPLANATION OF FIGURES.

1. Edge of one of the nodules on costal pleura. Leitz, Obj. 2, eyepiece 1.

2. Higher power of pleural epithelium shown in Fig. 1. Obj. 4, eyepiece, 1.

3. Villi on costal pleura between two larger tumor nodules. Obj. 2, eyepiece 1.

4. Costal pleura between two nodules. Shows the neoplasm also in the subpleural tissues. Obj. 2, eyepiece 1.

5. Base of a large costal nodule. Subpleural tissues shown in lower part of figure. Intracystic papilloma. Obj. 2, eyepiece 1.

6. Higher power of part marked x in Fig. 5. The lower epithelial line corresponds in position to the serous covering of the pleura. Obj. 4, eyepiece 1.

7. From more superficial portion of same nodule shown in Figs. 5 and 6. Proliferation of cells tending to fill up the spaces. Obj. 4, eyepiece 1.

8. From highest point of nodule shown in Figs. 5, 6 and 7. Advanced stage of process shown in Fig. 7. Solid epithelial nests separated by connective tissue strands. Obj. 4, eyepiece 1.

9. Visceral pleura with extension of tumor into lung. Acute exudate on surface, below which is a layer of granulation tissue, then small spaces lined by tumor cells, which extend further into the lungs as an adenocarcinoma. Note atelectatic lung in lower left corner of figure. Obj. 2, eyepiece 1.

10. Higher power of part of Fig. 9. Obj. 4, eyepiece 1.

11. Nodules on surface of lung More regular adenomatous structure with papillomatous projections into lumen (upper right of figure). Tumor cells of less typical structure invading atelectatic lung (lower left). Obj. 4, eyepiece 1.

12. Deeper portion of adenocarcinoma invading atelectatic lung. Obj. 4, eyepiece 1.

13. Metastasis to bronchial lymph node. Obj. 4, eyepiece 1.

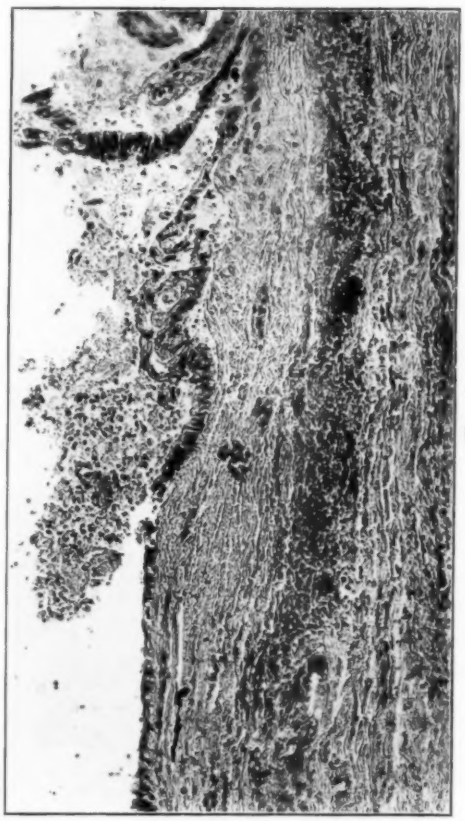

FIG. 2.

FIG. 4.

FIG. 1.

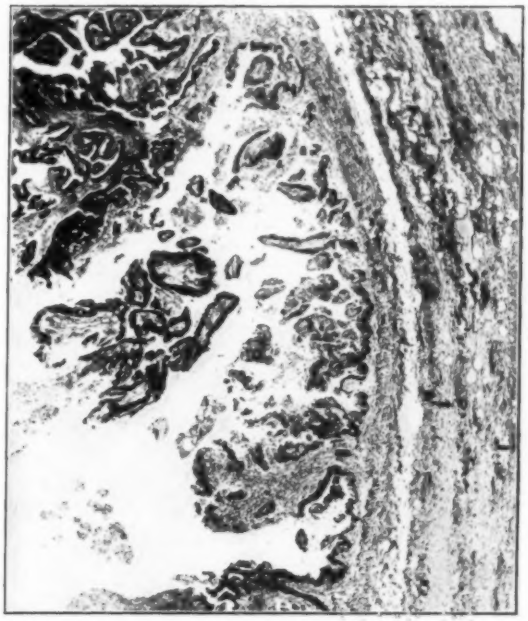

FIG. 3.

FIG. 6.

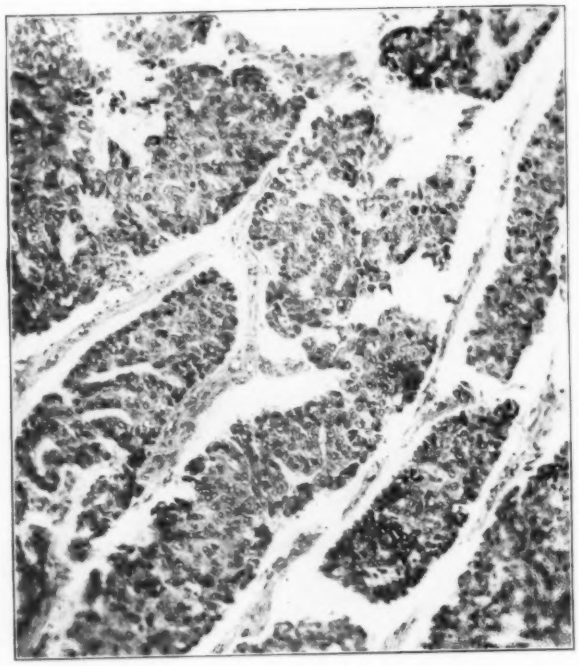

FIG. 8.

FIG. 5.

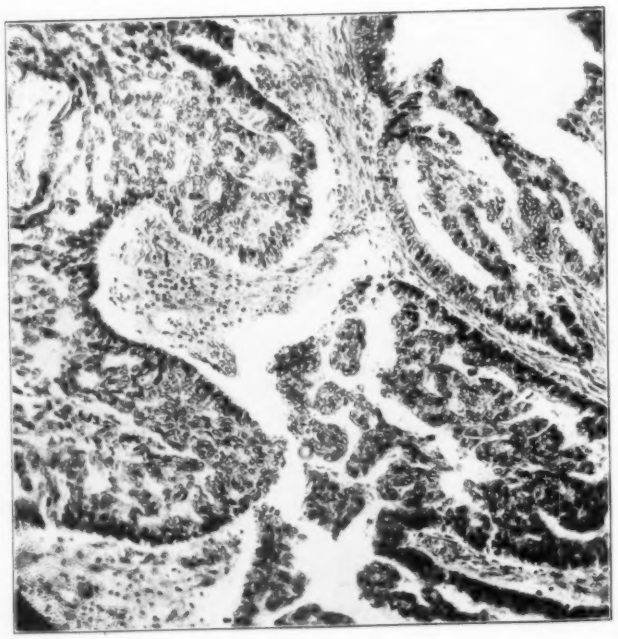

FIG. 7.

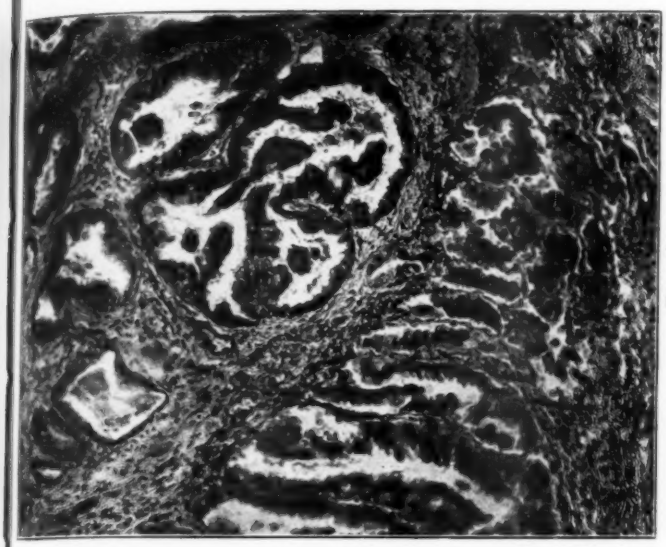

FIG. 11.

FIG. 13.

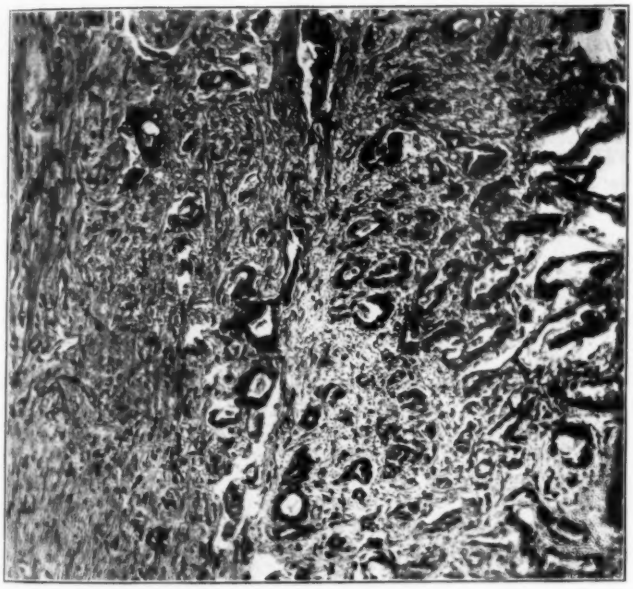

FIG. 10.

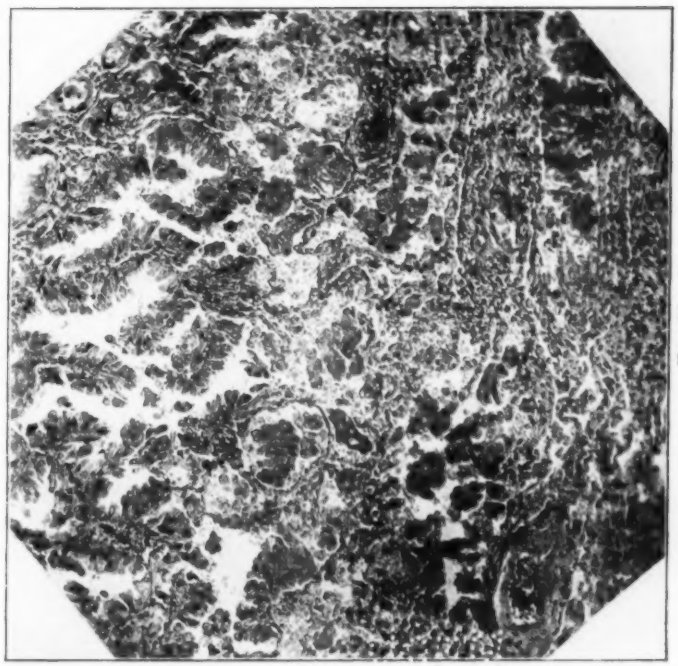

FIG. 12.

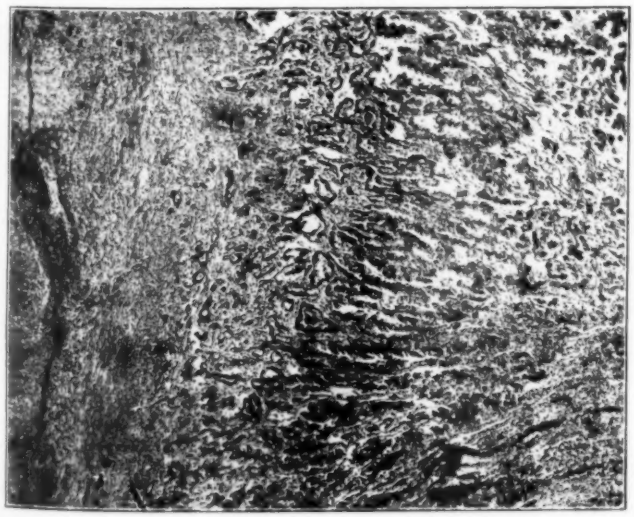

FIG. 9.

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REPORT OF A CASE OF PUERPERAL INFECTION WITH ISOLATION FROM THE UTERUS OF *B. INFLUENZÆ* AND A NEW METHOD FOR MAKING BLOOD AGAR FOR ITS CULTIVATION.

By WILLIAM THALHIMER, M. D.

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Since the discovery by Pfeiffer in 1892 of *B. influenzæ* along with methods for its cultivation and recognition, the wide-spread occurrence and importance of this organism have everywhere been recognized. At first it was believed to affect only the respiratory tract, but many cases are now on record of meningitis, endocarditis with bacteræmia and middle ear disease due to this bacillus, which has also been recovered from an infected gall bladder by Kinna and by Heyrovsky, and from the urethra by Cohn. A search of the literature has revealed, however, only one case where this bacillus was recovered from the female genital tract. This is a case reported by Kiskault under the title "Influenzabacillen bei Pyo- und Hydro-Salpinx," and is briefly as follows:

History.—Frau E., 40 years old, married 14 years, sterile. Nine years ago the patient was operated on for disease of the right ovary.* Since then has been troubled off and on with dysmenorrhœa. Has been under observation for three and a half weeks, and since yesterday has had severe abdominal pain, and since last night has had slight bleeding from the uterus.

Status.—Uterus small, ante-dextroposed, resting upon the symphysis, and behind it is a massive exudate.

Operation.—April 22, 1905. Posterior vaginal incision with thermocautery and opening of both sides of exudate. From right side flowed pus and from the left bloody serum. Drainage inserted. April 26, drainage removed. Slight discharge, a little pus. May 22, dilatation of opening. June 6, discharged. Uterus ante-flexed, still a slight exudate to right. Slight discharge.

Microscopic examination of pus showed many extra-cellular, minute, Gram negative bacilli. A small number of the same were found in the fluid from the exudate of the left side.

There was a typical growth of colonies of influenza bacilli on blood-streaked agar and the same on agar smeared with pus. No growth, however, in bouillon and plan agar. Subcultures were easily grown on blood agar.

Additional History.—On further questioning, the patient said she had an attack of influenza eight or nine years previously, but none since then.

* The nature of this ovarian disease is not stated and therefore the possible relationship between it and the attack of influenza, mentioned in the additional note, cannot be determined.

In light of this solitary finding in the literature the following case seems worthy of being placed on record.

Mrs. ———. Thirty-one years old. Admitted January 19, 1911.

Family History.—Negative, except that about one year ago the patient's husband was treated at the University Hospital for an acute unilateral gonorrhœal epididymitis, the gonococci being found in smears.

Past History.—Usual children's diseases and a severe attack of influenza 15 years ago when the patient was 16 years old. This lasted for two weeks, with pains in limbs, cough and purulent expectoration, but the patient was not forced to take to bed. There has been no attack of a similar kind since then, but patient is prone to catch cold, having several attacks every winter. Genito-urinary history negative, menstruation normal, never any abdominal pain. Patient has one child two years old; this pregnancy, labor and puerperium were normal.

Present Illness.—Four days ago after a normal pregnancy, patient passed through a normal labor, and felt tolerably well after the child was born, not feeling badly till three days afterwards, when she was troubled with a severe pain in the lower abdomen. She had no chills at this time but later in the night had several, and after each one felt feverish. The next day a physician was called who advised her to enter the hospital.

Status Præsens.—On admission patient's temperature was 105.4° F., pulse 140, respiration 30, and leucocytes 12,400. Except for tenderness in lower abdomen, especially on right side with slight muscle spasm, physical examination was negative. No mass could be felt.

Local Examination.—Patient taken to operating room, prepared for vaginal examination. Culture taken from uterine cavity on plain agar. Uterine cavity then investigated with little finger and no retained secundines found. Uterus was the size of normal involuting uterus at this period and no pelvic exudate was felt.

Course in Hospital.—A moderate sized, firm, pelvic exudate developed in the right broad ligament in two days, and was palpable and tender in the right iliac fossa. Temperature fell in three days to about normal and after that ran an up and down course, patient having chills on second and third days. Patient left hospital, against advice, 26 days after admission, still having an irregular low temperature and slight pelvic exudate, but the mass palpable in the right iliac fossa had disappeared.

Note Three Months Later.—Patient has had no further symptoms since leaving the hospital and now feels entirely well.

Blood culture, January 19, 1911, 4 P. M., was negative.

Bacteriology of Culture from Uterus.—After 24 hours incubation, the culture tube showed no visible growth, but a dulling of the entire surface. Smears revealed practically a pure culture of a very minute, slender bacillus and a few cocci in chains. Subcultures on blood agar gave in 24 hours a profuse growth of minute, discrete dew drop colonies and three or four raised, opalescent colonies, 1 mm. in diameter. The former proved to be the minute bacillus and the latter the coccus. These two organisms were isolated with difficulty by streaking them on blood agar tubes, and the coccus demonstrated to be a streptococcus. Its pathogenicity was not determined. The small bacillus grew as above on blood agar only, and did not grow on bouillon, serum bouillon, plain, glucose, and plain serum- and glucose-serum-agar, litmus milk, potato, and gelatin. It was Gram negative, stained densely and best with carbol-fuchsin diluted in water, and was then seen as a very minute slender bacillus, showing a very polymorphic appearance, sometimes straight, sometimes comma-shaped, and varied from coccoid forms, some at the limit of visibility, to bacilli from 0.5 to 1.0 μ long. In all the subcultures this variation in form and size was noted. From the above data the diagnosis of *B. influenzæ* was made. This organism was sent as an unknown to Dr. George Baehr, of the Pathological Department of the Mount Sinai Hospital, New York City, and this same diagnosis arrived at by him.

The finding of the *B. influenzæ* in the case cannot definitely be explained, and to attribute it to the attack of influenza, 15 years previously, would certainly not be justifiable. But the similarity of this history to that of the only other recorded case is either to be considered as quite suggestive or else a rather unusual coincidence. The other possibilities to be considered are an accidental infection at the time of labor or else an infection of some portion of the patient's genital tract with a streptococcus and the *B. influenzæ*, previous to labor. This may have occurred from coitus with her husband who was suffering from the venereal infection, but the *B. influenzæ* in this latter condition is also uncommon. What part of the infectious process was due to the influenza bacillus and what to a streptococcus could not be determined, but from the predominance of the bacilli in the first culture tube, the surmise is justifiable that the *B. influenzæ* was also the main factor in causing the pelvic infection. It is interesting that the blood culture taken at the height of the temperature was negative.

The second part of this report concerns itself with a new blood agar medium for the cultivation of the *B. influenzæ*, but before proceeding with this it may be worth while to review briefly the history of blood media in relation to this organism.

* The isolation of the *B. influenzæ* is very difficult and was first performed by Pfeiffer. This he did by smearing agar tubes with pus from patients' bronchial secretions. From these cultures he was unable to secure growth in subinoculated plain agar tubes and realized that growth in the first cultures was due to some constituent in the pus. After trying many media he secured typical growth on an agar tube whose surface had been smeared with a drop of human blood removed aseptically. Next he undertook to find what constituent of blood was the necessary one. He found that the *B. influenzæ* would not grow on human blood serum but would grow on red cell agar made from washed red blood corpuscles. The final step was to discover what constituent of the red blood cells was the essential one. Accordingly he laked some washed red blood cells either by alternate freezing and thawing, or by addition of ether, which was later removed by evaporation in a vacuum. The stroma of the red blood corpuscles was removed by filtration through a "kieselgur" filter. The clear, chemically pure, blood coloring substance, dissolved in 0.6% saline solution was added in an amount of one drop to each tube of agar. These tubes were inoculated with the *B. influenzæ* and colonies appeared as numerous on them as on blood agar. Growth also occurred in hemoglobin bouillon, but not in tubes of agar mixed with stroma of red blood corpuscles from which all the hemoglobin had been removed.

Since this work other media for growing the *B. influenzæ* have been invented, but none are as satisfactory as blood agar.

Beck, a student of Pfeiffer, continued this work and found that blood agar made from pigeon's blood was the one most favorable for this organism's growth, it growing more slowly on human and rabbit blood agar. Nastjukoff reported growth of the *B. influenzæ* in pure culture on media of yolk of egg and claimed this was due to hematogen, which he isolated from it. Voges, after many experiments, was unable to verify this work of Nastjukoff. Capaldi also refutes this work because he found that the *B. influenzæ* grew very poorly on agar to which he added lecithin or hematogen. Cantani reported satisfactory growth on agar streaked with semen of animals, and claims that his work shows that the growth of the *B. influenzæ* cannot be attributed to hemoglobin alone, but is also due to cholesterin and serum albumin substances which occur naturally in semen. Kolle and Delius obtained good growth, especially on the bottom of the flask, when 0.25 to 0.5 cc. of pigeon's blood was added to 30 cc. of bouillon, this shaken, and then frozen and thawed to get the corpuscles laked and the hemoglobin in solution. Grassberger thinks that one gets better growth of the *B. influenzæ* in symbiosis with staphylococcus or on media on which staphylococcus was previously grown. Cantani found that the *B. diphtheriæ* and gonococcus promoted growth of the *B. influenzæ*, and Neisser grew it in symbiosis with the xerosis bacillus. Ghon and Preiss could not cultivate the *B. influenzæ* on hemoglobin free media, but obtained luxuriant growth on hemoglobin agar. Richter investigated the growth of the *B. influenzæ* on the following media with unsatisfactory results: sterile sputum, sterile bile, yolk of eggs, and agar with Schmiedeberg's ferratin.

* The following is extracted mainly from the article on Influenza by Beck, in Kolle and Wasserman's Handbook, Vol. III.

Huber invented and used successfully hematogen agar made as follows from Dr. Hommel's hematogen: Add caustic potash to a solution of hematogen in water till the reaction is strongly alkaline. Boil or steam, sterilize, and filter; the precipitate is separated from the filtrate which latter is a bright red fluid and can be sterilized in an Arnold steam sterilizer, without coagulation or injury. This sterile preparation is added to sterile liquid agar at 50°-60° C. and tubed. The hematogen must be sterilized separately because the original alkalinity must be preserved so that it will not coagulate when heated to 100° C. Huber reports that the growth is less luxuriant and slower on this medium than on blood agar, taking from 2 to 8 days to become visible, but the *B. influenzæ* seems to remain alive longer, he having made successful subcultures at the end of 35 days from a surface inoculated tube and at the end of 60 days from stab cultures. This work is important for it shows that oxyhemoglobin is not necessary for growth of the *B. influenzæ*, but merely the iron radicle of the hemoglobin.

One other medium is worthy of note: that of Bernstein and Epstein from the Pathological Laboratory of Mount Sinai Hospital, New York. This is made from whole beef blood and not from a definite blood or hemoglobin product. It is made as follows: "400 cc. of beef blood are drawn directly into a 500 cc. Erlenmeyer flask containing 30 cc. of a 1% solution of ammonium oxalate (to prevent clotting) and 0.5 cc. of formalin of 40 volume strength. The flask is shaken for two minutes. Thirty minutes are required for sterilization of the blood, which is then transferred in small quantities into sterile Erlenmeyer flasks and diluted with twice its volume of 0.9% sterile saline solution. This dilution reduces the actual formalin content to one part in 2400 of blood. This is allowed to stand for 24 to 48 hours for diffusion of formalin and then added to agar or bouillon in proportion of one part to fifteen. Luxuriant growths of pneumococcus, meningococcus, gonococcus and influenza bacillus are readily obtainable."

A résumé of these methods shows that the only media on which one can consistently and readily cultivate the *B. influenzæ* are those containing fresh blood, or hemoglobin obtained from fresh blood; for the slow growth on Huber's hematogen media cannot be considered satisfactory. The method used by Pfeiffer for obtaining hemoglobin is rendered complicated by the necessity of a freezing and thawing process or else by the necessity of evaporating the ether in a vacuum, procedures too cumbersome for use in routine manufacture of laboratory media. The method of Bernstein and Epstein is uncertain in yielding sterile media but when this is accomplished the media is very satisfactory. It is to be regarded with some skepticism if 30 minutes contact with formalin in a dilution of 1 to 860 is sufficient to sterilize the blood used. The recent work of Post and Nicoll, which the author working with Mr. Palmer has been able to confirm, would indicate that formalin is inefficient as a bactericide at this dilution, in this length of time.

Blood agar is usually made from blood obtained from a hospital patient. This is withdrawn with a syringe from the veins at the bend of the elbow and immediately mixed with agar in a flask and poured into sterile tubes. The inconvenience of this method and the difficulty of obtaining permission to get this blood, even when the laboratory is associated with a hospital is evident.

The two following methods were investigated in an attempt to provide a simple laboratory method for making a hemoglobin or blood medium capable of growing the *B. influenzæ*. Only the second one, however, proved successful.

The first investigation was an attempt to utilize a beautiful crystalline hemoglobin product, obtained from Armour and Company through the courtesy of their laboratory. A solution of this coagulated at 60° C., forming a muddy precipitate in a colorless fluid and was, therefore, impossible to sterilize when in solution. It was found that the material underwent no change when heated in a hot air oven at 115° C. for one hour, but this procedure did not yield a sterile product for, although it was tried a number of times, in every case when dissolved in sterile distilled water and streaked on agar, in a 24-hour aerobic culture, a profuse growth of a large spore-forming bacillus occurred. This organism was not identified. A solution of unheated hemoglobin in distilled water was next freed from bacteria by passing it through a sterilized Reichel filter. This gave a solution, brownish red by transmitted light, which was added to tubes of melted agar at 45° C. in quantities sufficient to give a light brown medium, of about the same density of color as ordinary blood agar. There was always plenty of water of condensation present, and although many inoculations were made of a strain of the *B. influenzæ* and the strain isolated from the above patient, in no case was a visible growth observed, though usually in 24 to 48 hours many typical forms could be demonstrated in smears made from the surface of the inoculated tubes, and in a few cases successful plants were made from these tubes to blood agar tubes and tubes of the media made by the second method. This is not considered as evidence of growth on this hemoglobin agar, but rather a proof of just the opposite. Certainly this is not practicable as a laboratory medium.

Second method: Freshly drawn beef blood obtained from an abattoir was collected in a wide mouthed jar and defibrinated by shaking with a number of medium sized marbles. This was laked by adding an equal part of distilled water and rendered free from bacteria by passing through a sterile Reichel filter as above. This yielded a beautiful, clear, red fluid and 20 to 30 cc. of this were added to a liter of sterile melted agar at 45° C. and poured into sterile tubes. The medium which resulted was also perfectly clear, bright red and of the same density of color as ordinary blood agar. On this medium the two organisms, which were unsuccessfully tested on the hemoglobin agar, were successfully passed through 10 subcultures. The growth occurred in 24 hours, and was typical of the *B. influenzæ*, occurring luxuriantly in small, discrete, dewdrop colonies. Smears showed the typical morphology. Pneumococcus, streptococcus, streptococcus mucosus and gonococcus also grew luxuriantly.

This method is a modification of former methods, notably

that of Pfeiffer, and is believed to be the simplest yet devised for making blood agar. Its chief advantage over that of Pfeiffer is that the laking agent is one which does not interfere with growth of bacteria and does not have to be removed. From 40 to 50 cc. of this laked blood can be filtered in 24 hours through a Reichel filter of 50 cc. capacity. Where a larger quantity is needed a larger filter can be used. It is evident that the hemolytic qualities of an organism cannot be tested with this medium.

In conclusion the author wishes to express his indebtedness to Dr. H. T. Marshall for his helpful suggestions in this work, and also to Dr. George Baehr for the strain of the *B. influenzæ* used in this work and for his report on the organism which was isolated from the case reported.

The opportunity to study the above case was afforded the author by Dr. Makin, in whose service at the University of Virginia Hospital the patient was treated.

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HYPERLEUCOCYTOSIS OF HIGH GRADE IN BRONCHO-PNEUMONIA IN A CHILD.

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On November 23, 1909, C. R., a colored child aged four years, was admitted to the Johns Hopkins Hospital, complaining of "cough and pain in the stomach and throat." The past history was negative, except for measles and chicken-pox one year ago. The illness which brought the patient for treatment began on November 9, fourteen days before admission, with cough—at first unproductive, occurring in nocturnal paroxysms, at times so severe as to induce vomiting, and later becoming more frequent with the expectoration of tenacious mucous sputum which was never blood-tinged. There had also been fever, night sweats, anorexia and constipation.

The child was small, fairly well nourished, with marked dyspnea and tachypnea, respirations fluttering, 100 to the minute. The alæ nasi were dilating, the lips cyanosed, and with each expiration there was a short grunt. The head was negative; there was no mastoid tenderness, nor signs of aural or meningeal disease. There was moderate general glandular enlargement.

The thorax was rounded; a rickety rosary was palpable; there was a tendency to "pigeon breast." The respiratory movements were mainly abdominal and the thoracic expansion was limited on the right side. The vocal fremitus was not tested. Percussion revealed Skodaic resonance at the right apex, tympany over the upper portion of the right lower lobe, and impaired resonance in the axilla, merging into dulness at the base behind. On the left side Skodaic resonance was present over the front as far as the third rib, though there was normal resonance below. Behind, dulness was present from the apex to the mid scapular region; there was slightly impaired resonance as far as the angle of the scapula, and normal resonance below. There was nowhere absolute flatness. On auscultation, intense tubular breathing was heard over both upper fronts and backs, also over the lower right back, and numerous consonating crackles were audible in the dull areas at the end of inspiration. Over the middle and upper part of the right lower lobe medium and coarse moist râles and a leathery friction rub were heard.

The cardiac dulness was not increased. There was marked

tachycardia with fœtal rhythm and the sounds were clear. Examination of the abdomen showed marked tympanites. The liver dulness extended from the sixth rib to a point 4 cm. below the costal margin in the right mammillary line, where a firm edge was readily palpable.

On November 24, there was a generalized clonic convulsion with unconsciousness, blepharospasm, turning of the head and conjugate deviation of the eyes to the left, and loss of sphincter control. After it had lasted fifteen minutes, the paroxysm was aborted by immersing the child in a hot mustard bath.

By November 27—the eighteenth day of the illness—the signs of consolidation at the apices had practically disappeared, but dulness, with tubular respiration and crepitation, was still present over the right lower axilla and back, and now for the first time a to-and-fro friction rub was audible over this area. The signs of consolidation were made out on the left side, from the apex to the angle of the scapula, and also over the lower front and axilla, where too there was a leathery rub. Two days later, the condition was more grave, and over the right mastoid, involving the tissues over an area about 5 cm. in circumference from its tip, there was a large ruptured bleb with brawny induration and tenderness about it, and the associated lymph glands were tender and swollen. The right tympanum was now tense, red, and lusterless. At 7 p. m. the child began to vomit and at 7.25 p. m. suddenly expired.

During the disease the temperature ran an irregular course around 103° F., showing marked remissions after the sponges, the fever occasionally falling as much as 3°F. in two hours. Polypnea was marked and persistent, the respiratory rate varying from 60 to 106 to the minute. Tachycardia was also pronounced, the pulse ranging from 140 to 195 to the minute.

This clinical picture is common—a case of pneumonia with one of its most usual complications, mastoiditis—but the blood findings make the case of interest.

On admission, the red blood cells numbered 4,860,000 per cmm., the hæmoglobin was 87 per cent (Sahli) and the leucocytes 130,000 per cmm. Seven hours later, the leucocytes were 144,000 per cmm.; on the morning of November 24, they had increased to 183,000 per cmm. and that evening reached a maximum of 206,000 per cmm. During the following four days they varied between 126,000 and 156,000, but with the onset of the mastoiditis again rose to 192,000 per cmm.

The marked leucocytosis caused us to suspect the presence of a purulent focus, or the possibility of a leucemia with a terminal pneumonia. The former we had no reason to assume, inasmuch as there were no signs of pus anywhere, no evidence of an empyema, of a sinus infection, of otitis or of mastoiditis, the latter not appearing until the day of death. A possible leucemia was excluded by the differential counts:

Ehrlich Stain.—The red corpuscles showed very little polychromatophilia, no marked anisocytosis or poikilocytosis, few normoblasts and no megaloblasts. The white cells, in general, were readily classified, one type, however, being difficult to identify, *i. e.*, a rather large cell with pale homogeneous, pink-staining, non-granular cytoplasm, and a slightly lobulated nucleus with a well defined chromatin net and sharply defined nuclear membrane.

In 500 cells counted there were:

	Nov. 24.		Nov. 26.		Nov. 28.		Nov. 29.	
Polymorphonuclear	Cells.	%	Cells.	%	Cells.	%	Cells.	%
neutrophiles	260	52	280	56	300	60	270	54
Polymorphonuclear eosinophiles	20	4	15	3	10	2	15	3
Lymphocytes	120	24	105	21	100	20	110	22
Large mononuclears..	3	0.6	8	1.6	10	2	20	4
Transitionals	15	3	10	2	5	1	10	2
Myelocytes	60	12	70	14.0	50	10	60	12
Unclassified	22	4.4	12	2.4	25	5	15	3
	500	100.0	500	100.0	500	100	500	100

In 500 white cells counted there were:

Normoblasts	4	6	2	9
Megaloblasts	—	—	—	—

The relative lymphocytosis is not unusual during an acute infection in a child of four, and the presence of 12 per cent of myelocytes does not necessarily militate against a diagnosis of leucocytosis as differentiated from leucemia (Cabot, Musser and Steven). Moreover, the absence of a marked anæmia and the post mortem findings exclude a leucemic process.

The post mortem findings were as follows (Dr. Winternitz):

Anatomical Diagnosis. — Broncho-pneumonia, bilateral. General lymphoid hyperplasia and hyperplasia of the bone marrow. Acute mastoiditis, right, with thrombosis of the superior petrosal sinus and of the adjacent sinuses of the brain. Congestion of the brain, especially of the right hemisphere. Cloudy swelling of the liver and of the kidneys.

The body is that of a fairly well nourished child 93 cm. in length. Rigor mortis is present. Over the right mastoid there is swelling with reddening of the skin, the upper layers of which are broken.

The peritoneal cavity is normal except for a great enlargement of the mesenteric lymph glands, which, on section, have a gelatinous, homogeneous appearance.

The left pleural cavity contains a slight excess of straw-colored fluid; the right is partially occluded by recent fibrinous adhesions.

The thymus is small and pinkish brown in color.

The heart is not enlarged; the myocardium and the valves are normal.

Lungs: the left lung is pale, voluminous, and retains its shape after removal. It is everywhere crepitant except over a few small areas of consolidation in the posterior portion of the lower lobe. The bronchi contain an excess of fluid, and the bronchial lymph glands are much enlarged. Right lung: the pleural surface is covered with a friable grayish exudate which is several millimeters in thickness. Two-thirds of the lower lobe is occupied by areas of consolidation which, on section, are dry, granular, and slightly translucent, and there are a few small areas of like character in the upper lobe.

The spleen measures 9 x 4 x 2 cm. and retains its shape after removal. Its capsule is delicate and the red splenic pulp is seen through it. On section, the Malpighian corpuscles are gray and tremendously enlarged; so much so, that neighboring

ones are almost in contact. Neither the fibrous tissue nor the pulp is much increased.

The stomach, the duodenum, the pancreas, and the intestines are normal. There is no hyperplasia of Peyer's patches or of the solitary follicles.

The liver measures 19 x 12.5 x 5 cm. The capsule is thin and delicate. The liver parenchyma is purple in color, and on section the lobules are large and distinct. The gall bladder is normal.

The brain: the dura mater is thick and adherent. The right cerebral hemisphere is covered with dilated vessels; the left is pale and only a few of the vessels are injected. The superior and inferior petrosal sinuses on the right are distended and filled with thrombi. There is a large amount of pus in the spongy portion of the bones of the right middle ear, and the ossicles lie free in a necrotic sequestrum. The brain tissue is normal except for the congestion of the right hemisphere.

Microscopic Examination.—Lungs: the pleura is covered by an exudate consisting mainly of polymorphonuclear leucocytes. The alveoli of the lungs are filled with an exudate varying from a very cellular material in which mononuclear cells predominate, to one almost purely fibrinous in character, and where the latter type is present the alveolar walls are involved. In places there are zones of coagulation necrosis.

The thymus shows well preserved gland tissues with conspicuous Hassal's corpuscles.

Sections of several lymph glands show a marked dilatation of the sinuses, in which there are many large mononuclear cells with pink-staining cytoplasm and vesicular nuclei. A few of these cells show definite granular inclusions. The lymphatic strands are coarse and show an increase of the mononuclear elements. The centers of the lymph follicles stain deeply and uniformly with eosin.

In the anterior and middle portions of the hypophysis are cyst-like areas which contain colloid in excess, and in one of these areas there is a fibrous thickening in which there are a few typical mucous glands.

The liver cells are swollen and there is an infiltration of the parenchyma with mononuclear cells, some of which have deep pyknotic nuclei. Polymorphonuclear leucocytes are less numerous, and only an occasional myelocyte is seen. The stellate cells of Kupfer are enlarged, and in some places have taken on phagocytic activity. The predominating cell in the blood clots is the large mononuclear lymphocyte.

The bone marrow shows marked hyperplasia, but there are still some areas of fat remaining. In the smears and sections the large neutrophilic myelocyte is the predominant cell. The erythroblastic tissue is increased somewhat less than the myeloblastic and relatively few normoblasts and megaloblasts are seen. The polymorphonuclear neutrophiles are relatively few and there are many giant cells. With Ehrlich's stain only a few myeloblasts are seen. In the marrow there are several small areas of hæmorrhage, and near the areas of softening a few small thrombi are found.

Hyperleucocytosis in the sense of excessive leucocytosis is not uncommon and counts of 80,000 or more leucocytes per cmm. have been reported in many conditions. Leucocythemias of over 100,000, except in leucemia, however, are comparatively rare. The following may be cited as the maximum counts found in a cursory survey of the literature on this subject:

Limbeck,[1] quoted by Sisto,[2] noted a leucocytosis of 120,000 in a patient with multiple carcinoma, and Kast reported an identical count in a similar condition.

Hirschfeld and Kothe[3] report a leucocytosis of 190,000 (56 per cent polymorphonuclears and 7 per cent myelocytes) in a case of appendicitis gangrenosa complicated by a hæmorrhage from a duodenal ulcer. This is a most phenomenal finding, as may be seen from the exhaustive study of Busse.[4]

Felsenthal[5] counted 148,229 leucocytes per cmm. in a child with gangrenous diphtheria and petechiæ.

Osler[6] cites a case of lobar pneumonia with 114,000 white cells, and Læhr, quoted by Emerson,[7] Arneth and Türk,[8] found 115,000 leucocytes per cmm. in a similar case, and these authors could find no more marked leucocytosis in pneumonia reported in the literature as late as 1904. Cabot[9] mentions a case of broncho-pneumonia complicating pertussis, in a girl aged six years, where the leucocytes reached 94,600 per cmm. and another case where they were 185,000 per cmm.

The most marked leucocytosis in pneumonia in the records of the Johns Hopkins Hospital is 105,000 per cmm. in a man aged 25 years.

Fletcher and Sappington[10] reported a case of spleno-hepatic cirrhosis in which there was a leucocytosis of 136,000 per cmm. (89 per cent polymorphonuclears) and this is cited by Cabot[11] as the most marked polymorphonuclear leucocytosis he could find on record.

Those who have reviewed the literature on leucocytosis seem to have overlooked an article by Steven[12] on broncho-pneumonia in childhood, in which a case is reported with a leucocyte count of 236,000 per cmm. (33.6 per cent polymorphonuclear, 50.2 per cent lymphocytes, 15.2 per cent large mononuclears, 0.57 per cent eosinophiles). This case, it is seen, is practically identical with the one here described, *i. e.*, a child twenty-two months old, with cyanosis, dyspnea, tachypnea (103 to minute), crepitant râles over both lungs, and convulsions.

To sum up, we have here a phenomenal hyperleucocytosis occurring in a case of broncho-pneumonia in childhood.

The formula as determined by repeated differential counts shows a marked mononucleosis and a moderate myelocytosis—a picture neither uncommon nor unique in this disease.

Leucemia is definitely excluded by the history, by the physical findings and by the necropsy.

The case seems worth recording, as this hyperleucocytosis is second only to that reported by Steven in a similar case.

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THE VIABILITY OF PARASITIC OVA IN TWO PER CENT FORMALIN, WITH ESPECIAL REFERENCE TO ASCARIS LUMBRICOIDES.

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It has been a routine procedure for several years in the clinical laboratory to preserve stools, for purposes of demonstration, with formaldehyde. The fæcal material is finely comminuted in water so that a relatively thin suspension is secured. Commercial forty per cent formalin is then added to the fæcal suspension in such quantity that the resulting mixture contains the reagent in a strength of two per cent. For most purposes stools are well preserved in this way and when tightly stoppered in bottles, may be kept for an almost indefinite period. Putrefaction and fermentative changes are inhibited successfully.

The chief purpose for which we have employed formalin has been the preservation of material containing parasitic ova. Eggs of the commoner cestodes of man—Tænia saginata, Hymenolepis nana, and Dibothriocephalus latus, have retained their morphology fairly well, though the thin-shelled ova of the last two have shown greater alteration than those of Tænia saginata. To all appearances, the eggs have been killed, as no evidence of further development has been observed.

Trematode material has been more scanty, as we have only had specimens of Schistosoma hæmatobium and Schistosoma japonicum. The former has shown less change in shape, and in both specimens the eggs appear to have been killed.

With nematode ova, there have been rather interesting results. The eggs of the hook worm, Ankylostoma duodenale and Necator americanus, exhibit a certain amount of distortion of the shell. The formalin apparently does not kill the ova at once. Fæces containing eggs in the two-, four-, and eight-cell stages have been found later to have ova which in the majority of instances have passed beyond this stage, though death must be reasonably prompt, as we have never found embryos within the shell or free in the fæces. Inasmuch as the same stool has been examined by eighty to ninety or more students simultaneously, some of whom have studied several preparations, it seems probable that embryos would have been observed, if present. Eggs of Trichuris trichiura and of Oxyuris vermicularis have presented no signs of development in fæcal suspensions containing two per cent formalin.

Findings of special interest have been met with in connection with the ova of Ascaris lumbricoides. In January of 1909, while demonstrating a stool containing the eggs of Ascaris lumbricoides to the class, it was noted that many of the ova contained embryos which frequently exhibited active motility within the shell. The stool was of unknown source, unlabeled, and had been on a shelf exposed to the light but not to the direct rays of the sun for an unknown length of time. It had probably been preserved with formalin (odor). The same specimen was demonstrated to classes in June, 1909, January and June, 1910, and again in January, 1911, and on each occasion actively motile embryos were observed within the shell. In fact, they were so numerous that there was practically no difficulty in demonstrating them in every preparation examined. Embryos which were well preserved but non-motile during the short period of inspection were much more abundant than those seen in a state of active motility. Often an ovum containing a living embryo had lost the albuminous envelope. A few embryos which had escaped from the shell were observed but in all instances they were dead. An examination of the stool on May 19, 1911, demonstrates that living embryos still persist, *i. e.*, about twenty-nine months after they were first observed in the specimen. How much longer they have been there it is impossible to say.

An opportunity to confirm the results just narrated presented itself some time ago. O. R., Surgical No. 25086, white, æt. 13, was admitted to the surgical service of Professor Halsted on December 4, 1909, on account of double cataract. The routine fæcal examination disclosed the presence of "many Ascaris lumbricoides ova in the stool." The eosinophiles amounted to seven per cent. On December 9, 1909, a specimen of fæces was suspended in water and formalin was added so that it was present in a strength of two per cent. Microscopic examination at that time showed an enormous number of ova of Ascaris lumbricoides, both fertilized and unfertilized, the former predominating. The stool was demonstrated to the class in January and June, 1910. The ova were well preserved and no suggestion of

embryo formation was noticed, although carefully looked for. January, 1911, the specimen was used again for class demonstration and at this time a few fertilized ova were found which contained embryos, some of them actively motile. On May 19, 1911, examination of the specimen shows an *apparent* increase in the number of eggs which possess embryos, and in the first preparation studied an active parasite was seen. All seem to be well preserved morphologically and in the more mature embryos it is probable that prolonged inspection would reveal definite signs of life. Since the specimen was first obtained, it has been kept in a brown glass bottle, securely corked, on a shelf in the laboratory where it has been constantly exposed to the light but, like the preceding specimen, protected from the direct rays of the sun. It is unfortunate that examinations have not been made at more frequent intervals to determine how soon the living embryos first appear. They probably developed sometime between the sixth and thirteenth month.

That the ova of Ascaris lumbricoides are extremely tenacious of life has long been known. Davaine[1] showed that the eggs may be viable and still exhibit no sign of development for a considerable period of time. From the fæces of an infected child he recovered the eggs of Ascaris lumbricoides by washing the dejecta. They were then transferred to water on October 8th. The material was examined from time to time and it was not until the following April 14 that signs of development were noted. Three weeks later the embryos were seen in the shell. Later Davaine[2] showed that the embryos may remain alive in the shell for three years. Stiles and Gardner[3] have recently demonstrated that ascaris eggs are quite resistant to decomposition. In fæcal matter kept for four months (117 to 121 days), about eighty per cent of the ova appeared to be dead. Leuckart[4] proved that the ova can withstand desiccation, which, however, arrests the embryogenic process.

Thus, it is evident that the viability of Ascaris lumbricoides ova is not easily destroyed under the conditions usually met with in nature. It might therefore be supposed that the eggs would prove less susceptible to antiseptics than those of the other common intestinal parasites of man. With formaldehyde, at least, this is the case. An incomplete review of the literature on Ascaris lumbricoides has failed to reveal similar observations.

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ANTERIOR POLIOMYELITIS—NOTE.

I

The Rockefeller Institute for Medical Research, of New York City, announces that it will devote its resources very largely during the present season to the study of anterior poliomyelitis (infantile paralysis) and to the treatment of acute cases of this disease in its hospital. Physicians and health officers desiring to co-operate in this investigation may do so by sending information concerning the occurrence and prevalence of this disease, or by referring acute cases to the Hospital of the Rockefeller Institute. Dr. Flexner renews his request of last year that whenever possible a portion of the spinal cord and of the naso-pharyngeal mucosa derived from fatal cases of the disease be sent to him. Specimens should be preserved in glycerin and sent by mail to Simon Flexner, M. D., 66th Street and Avenue A, New York City.

II

Anterior poliomyelitis* is, so far as known, a communicable disease, being communicated from one patient to another and also by means of a third person. It occurs in epidemics and tends to spread along the lines of greatest travel. There is reason to believe that it is prevented from spreading by quarantine, and with the very great prevalence of the disease in the summer of 1910 it is the opinion of this committee that it is essential that it should be made a reportable disease in all States in order that its presence may be detected and its spread guarded against.

Of particular significance are the so-called abortive cases, where indefinite ailments occur in children in communities where frank paralysis also exists. These abortive cases of infantile paralysis are undoubtedly a source of infection, and their record and study is of much importance. In a community where cases of infantile paralysis occur, cases of illness with sudden onset of fever and meningeal symptoms should be closely watched and regarded as possibly infectious. In such cases even recovery without paralysis does not establish the fact, that the case was not abortive infantile paralysis.

All cases of infantile paralysis should be strictly quarantined, sputum, urine and feces being disinfected, and the same rigid precautions being adopted as in scarlet fever. This quarantine should, in the opinion of the committee, last for four weeks in the absence of definite knowledge as to when the infection ends. Children from infected families should not be allowed to go to school until the quarantine is abandoned. The transportation or transfer of acute cases in public conveyances should be strictly forbidden. It would be very desirable to adopt provisional quarantine measures in suspicious cases in a community where an epidemic prevails. The report of all cases of infantile paralysis to the public health authorities should be enforced by law, and all deaths from this cause should be properly described and registered. A careful study of epidemics by public health authorities is strongly advised.

(Signed) Robert W. Lovett, M. D., *Chairman.*
Henry Koplik, M. D.,
H. Winnett Orr, M. D.,
Irving M. Snow, M. D., *Secretary.*

* Circular issued by the American Orthopedic Association and the American Pediatric Society in reference to acute epidemic poliomyelitis, and addressed to health authorities and boards of health.

THE STARNOOK—A NEW DEVICE FOR THE REST-CURE IN THE OPEN AIR AND FOR OUTDOOR SLEEPING.*

By S. ADOLPHUS KNOPF, M. D.,

Professor of Phthisiotherapy at the New York Post-Graduate Medical School and Hospital.

Every physician interested in the treatment of tuberculosis knows how difficult it is to have anything in the line of additional porches or verandas built onto a city home. First of all in cities, like New York for example, wooden constructions are not permitted. The vast majority of houses are tenement or apartment houses, and even if there should be space, the owner would not permit any addition.

My purpose to-day is to show to those who are so fortunate as to have their own house in city or town, or to have an accommodating landlord, how they may avail themselves of a very new and practical device which will answer all purposes for outdoor life by day and by night. I am indebted to Mr. H. C. Ford, a young mechanical engineer, and to the Starnook Company, with which he is associated, for the construction of this device. As I have said, it is suitable for the rest-cure in the open air by day and for outdoor sleeping by night, and as the thought of the latter use came first, it has been called the "Starnook." This name is very appropriate for, as will be seen from the following description, on a clear night the stars can be seen from this little nook.

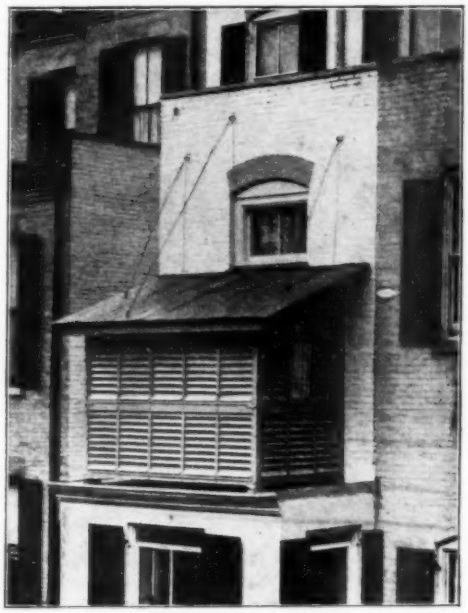

FIG. 1.—Starnook (Knopf Model) for the rest-cure in the open air and for outdoor sleeping at night.

I have slept in my starnook since October, 1910, and never have I had more peaceful nights, more sound and more refreshing sleep. To lie outstretched in the warm bed, breathing constantly the pure, fresh air, to be able to gaze at the beautiful sky, and watch the starry constellations without any effort, is a sensation which must be felt, for it cannot be described. I am inclined to believe that the most restless and nervous person will soon fall asleep in a quiet starnook. On bright, moonlight nights the scene is equally enchanting. Even on rainy nights with roof overhead and the slats of the shutters open to admit air, the sensation is a cozy one. One soon gets accustomed to the rain trickling on the roof and the monotonous noise of it is sleep inviting.

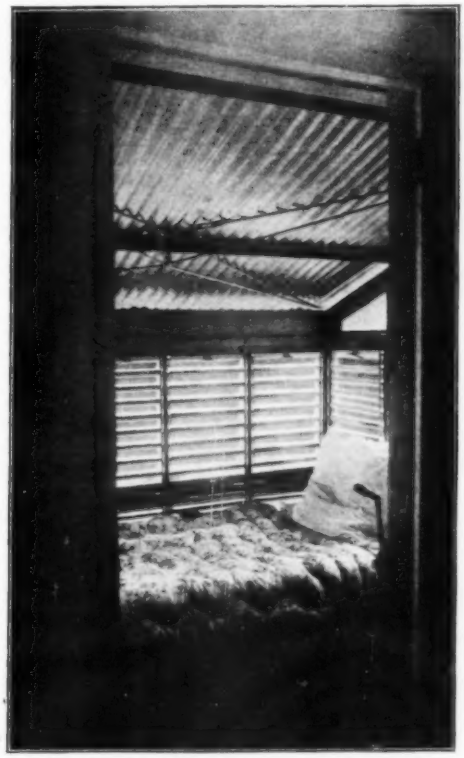

FIG. 2.—Interior of Starnook (Knopf Model) with windows, roof, and shutters closed. View from adjoining bathroom.

My purpose in having this starnook constructed was that it might serve as a model for tuberculous, pneumonic, or nervous patients who have been directed to live and sleep in the open air. As will be seen my own starnook (Fig. 1) is built on an extension at the rear of the house, but it could also rest on posts or columns, or triangular supports attached to the walls. The starnook consists of three walls composed of frames holding movable slats, of a roof and a floor. It is all made of galvanized iron with the exception of the floor, the

* Abstract from a lecture on Aerotherapy, delivered at the Johns Hopkins Medical School, Baltimore, March 27, 1911.

window sash and the roof-frame. The wall of the house closes the fourth side through which access is had to the starnook by a long window or a door. It is about 9 feet long, 6 feet deep, 6 feet high at the outer side, and 8 feet next to the house. It can also be made 8 feet deep and will then hold a bed and couch or two beds.

In either end is a glass window which can be opened outward, and Florentine glass fills the triangular spaces at each end under the slope of the roof, which rests a short distance above the walls to allow for free circulation of air at all times.

Figure 1 shows the starnook in use at night in rainy or stormy weather. Figure 2 gives an interior view, all closed except the door leading from the house into the starnook. On a clear night when there is no fear of rain or snow the roof of the starnook is raised by means of a crank and counterweights.

As seen in Figs. 3 and 4, the roof can be completely raised against the wall of the house and an unobscured view of the

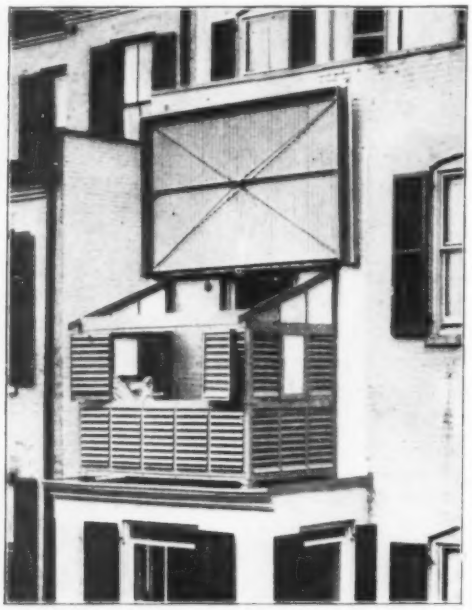

FIG. 3.—Starnook (Knopf Model) transformed from night-shelter to a pleasant rest-cure porch by day.

sky can be had by the occupant of the bed. During the day the starnook can be transformed into a typical rest-cure veranda. Three upper sections of the front shutters can be entirely opened, and with the two windows open and the roof up one is certainly out of doors. Figure 3 shows the starnook transformed from a night shelter to a pleasant resting porch by day time.

Figure 4 gives an idea of the interior aspect of the starnook by day with roof and all windows open.

The advantages of this device are manifold. When painted to match the house it forms an attractive addition. The slats that form the walls, instead of being straight, are bent inward at the lower edge and outward at the upper in such a way that when partly open they permit a free access of air, yet neither the bed nor the occupant of the bed can be seen by neighbors and absolute privacy is thus secured (Fig. 5).

In very stormy weather the shutters can be tightly closed (Fig. 6) to protect the occupant from rain, drifting snow and strong winds, and still there will be enough open spaces to allow the freest circulation of air. The lower sections of the shutters are manipulated simultaneously by means of a handle conveniently located so as to be reached from the bed. Each upper section has an individual handle whereby the slats can be placed at any angle desired. The handles are of wood so as not to chill the patient or occupant when he touches them in cold weather. An electric light which can be turned

FIG. 4.—Interior of Starnook (Knopf Model) with windows, roof, and shutters open. View from adjoining bathroom.

on and off with the aid of cords by the occupant of the bed, and a push button to call a maid or nurse in case of illness, complete the arrangement for comfort.

Sometimes the starnook cannot be constructed so that the roof can be raised upward to rest against the wall of the house. If this is the case, then the roof has to be tilted outward. When for one reason or other it is desirable to have the construction on the roof of the house, a starnook can be constructed with a little shack, the two joined together so that the latter can be heated when serving as a dressing room. To make a good support for the roof of the starnook when raised, the shack would have to be somewhat higher. Another way is to divide the roof into two sections so that they may better

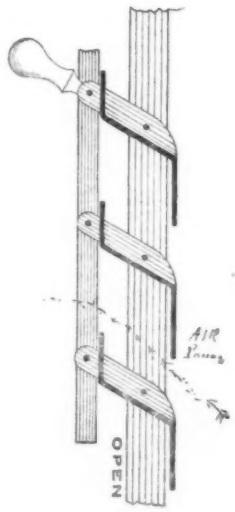

FIG. 5.

FIG. 6.

FIG. 5.—Diagram showing the mechanism of the movable iron slats.—Open.
FIG. 6.—Diagram showing the mechanism of the movable iron slats.—Closed.

withstand strong winds when the roof is open. The same plan can, of course, also be carried out on the ground, in the yard, or garden. If it is desired to have a double starnook, the two devices can be joined, the bathroom and dressing room being between them.

To the timid who are afraid of sudden rain showers or snow storms and believe that they cannot get the roof down quickly enough, or who fear to get out of the warm bed for the purpose of lowering the roof, there can be arranged an electric motor manipulating the raising and lowering of the roof quickly and securely, operated by means of a push button within easy reach from the bed.

It is hoped that with a demand for a number of starnooks, two different standard sizes can be put on the market at very reasonable prices. In presenting this new device to the profession and the public, the inventors trust to have been in a measure helpful not only in solving the problem of outdoor sleeping and outdoor resting for the tuberculous in cities, but also to have given opportunity to other sufferers to recuperate, and to the well and strong to enjoy constant fresh air, at least at night, and enable them to be more frequently in touch with nature than is granted to most city dwellers.

THE HAVEN OF HEALTH.*

A REVIEW.

By W. H. BERGTOLD, M. D., Denver, Colo.

In these days of wood-pulp paper and cheap bindings, it is refreshing to see and to possess a book which is venerable with age, so old that it is, as it were, a voice from the ancient dead. There is now such a book before us, and it will be used as a text for my portion of this evening's talks.

Let us read its title page, a photograph of which is here presented for your inspection (see p. 304); printed in 1636, the book harks back 274 years, and since it was written (1584) eleven generations have been born, have run the gamut of human efforts, hopes, desires, and sorrows, and have died. It seems a long time to me. Is it not of striking interest to us at this precise time and in this State, to see by the title page that nearly three hundred years ago a woman could run a printing establishment?

As a material object the volume has the additional attraction of exhibiting signs of the ravages of real book-worms.

How many of our present books will be found, 274 years from this day, in as good a condition as this old book? Very few, it is safe to predict.

The preface to this Haven of Health is inscribed 1584; such a date means but little to me unless I can orient myself by other chronologic marks. Perhaps some of you may have the same feeling, which will be excuse sufficient for me to try to fix this period in our minds by showing its relation to other dates and things. Elizabeth (1533-1603) was reigning in England when Coghan was writing, and he specifically mentions her on page 159.

Shakespeare's span was from 1564 to 1616; this shows us that the great dramatist was a young man of but twenty when Dr. Coghan's dedicatory preface was finished. If we think of medical men of the immediately preceding, contemporaneous, and directly succeeding years, we realize that but a little while had elapsed since Servetus was burned at the stake, that Paracelsus had been dead less than fifty years, and that Van Helmont was but a child of seven at the issuance of the first edition. Only two years before, Galileo had discovered the principle of the pendulum, and before he had made his immortal discoveries of Jupiter's moons, this book had gone through at least two editions. Some renowned medical men were born about this time; Harvey six years after the book was written, and Willis and Sydenham shortly before it came out in the fourth edition.

When the book was chosen as a subject for to-night's paper, the speaker immediately wrote to the secretary of the Royal College of Physicians, England, for information concerning Coghan; here is the result of this correspondence:

ROYAL COLLEGE OF PHYSICIANS,
PALL MALL EAST. LONDON, S. W., May 11, 1910.

DEAR SIR:—

I send you herewith some particulars of Thomas Coghan, M. A., which have been gleaned from various sources, and have, so far as is possible, been verified. . . . .

Yours faithfully,
(Signed) W. FLEMING.

W. H. Bergtold, Esq., M. D.

* Read before the Denver Medical History Club, January 6, 1911.

"Thomas Cogan, 1545-1607, physician, was born about 1545 at Chard, Somersetshire. He was educated at Oxford, graduated B. A., January 14, 1562-1563, M. A., July 5, 1566, and M. B., 1574. He became a Fellow of Oriel College in 1563, continuing until 1574. In 1574 he resigned his Fellowship and then (or in 1575) was appointed Master of the Manchester grammar school. He practiced as a physician at Manchester, taking a degree in that faculty in 1574. Before 1586 he married Ellen, daughter of Sir Edmund Trafford, and widow of Thomas Willott, who had property in Manchester. In 1591-3 he was the family physician of Sir Richard Shuttleworth. In 1595 he presented Galen's works, and other medical books, to the library of Oriel, where they are still preserved. He resigned the schoolmastership before 1602, died in June, 1607, and was buried on the 10th of that month in the Church of St. Anne's at Manchester. His will mentions property both in Somersetshire and in Manchester, and bequeaths books to all the Fellows and other officers of the college, and 4th, to each boy in the school. His widow died in 1611.

His works are:

1. The Well of Wisdome, containing Chiefe and Chosen Sayings Gathered out of the Five bookes of the Olde Testament . . . . 1577.

2. The Haven of Health, made for the Comfort of Students . . . 1584. (Several later editions.) With this was published "A Preservation from the Pestilence, with a short censure of the late sickness at Oxford," and several books in Latin intended as text-books.

THE

HAVEN

John OF Hohins 1726

HEALTH.

Chiefely gathered for the comfort of Students, and conſequently of all thoſe that have a care of their health, amplified upon five words of *Hippocrates*, written *Epid. 6. Labor, Cibus, Potio, Somnus, Venus.*

Hereunto is added a preſervation from the Peſtilence, With a ſhort cenſure of the late ſickneſs at Oxford.

By THOMAS COGHAN Maſter of Arts, and Batcheler of Phyſicke.

Eccleſiaſticus Cap. 37.30.

By ſurfeit have many periſhed: but he that dieteth himſelfe prolongeth his life.

The fourth Edition, corrected and amended.

LONDON,

Printed by ANNE GRIFFIN, for ROGER BALL, and are to be ſold at his, ſhop without *Temple-barre*, at the Golden Anchor next the Nags-head Taverne. 1636.

Wood, in his "Athenae Oxonienſis," from which most of the above notice has been taken by the writer of the article in the "Dictionary of National Biography," finishes with:

What other things he wrote I know not, nor anything else of him, only that he deceased at Manchester, in sixteen hundred and seven, and was buried in the Church there 10 June leaving behind him the character of an able physician, and Latinist, a good neighbor, and an honest man.

Through this information it becomes evident that Dr. Coghan was a man of parts, estimated by the then existing standards; one notes, too, with surprise that he did not get his degree in medicine until he was 29 years old, which may be of some comfort to those who regret that a son is, in these days, so long in going through the academic and professional schools. It does no violence to historical evidence to assume that the practice of medicine in those days was just as keen a competitive game as it is now, and Coghan's taking up teaching with practicing lends support to this notion. You will note that his biographer describes him as an "able physician"; there is however, to me, an indefinable something in this book, which gives me the impression that this man was not so much a real clinician as a student of medicine, a man who doubtless saw something of actual practice, but who wrote more from his book knowledge than from his bedside experience. This feeling has come to me between the lines of his book, as it were, notwithstanding that he clearly indicates that his book is intended as a guide to the preservation of health only, and the feeling may be wholly unwarranted.

Years ago in studying the birds mentioned by Shakespeare, the speaker gleaned a passing insight of the conditions of life in England during the period covered by the editions of this book; while the savagery of the times has doubtless been overdrawn, yet, softening it all we can, life then and there was far from gentle, and medicine was on a similar plane. We are apt to forget that there were no carpets, that dishes and forks were all but unknown at the table, and that slices of bread, called "trenchers," were served, to be used in place of plates. One gathers an inkling of these conditions, it seems to me, from various things in this book of "Health."

There was no such thing as sanitation, or hygiene; William Shakespeare, the poet's father, was fined, in 1552, twelve pence for not removing household dirt and refuse from his own door.

If one reads this book carefully and tries, even in a cursory way only, to follow some parallel and radiating lines of study suggested by it, one gains, it might be said, a liberal education. Let me hint at some things which aroused keen interest as the book was perused.

It is probably fair to assume that Coghan was as well educated as any average college man of his time; in effect it may be correct to feel that he was likely to have been better schooled than the majority of his classmates, since we find him teaching, and later, head master of a considerable school at Manchester. It is highly probable, then, that his pages reflect, tolerably well, contemporaneous knowledge, general and special. Hence one notes with interest the extremely divergent spelling in different parts of the book; it might be taken to signify that English spelling had not yet crystallized.

One sees, too, the use of "V" where to-day "U" is used, and also two "V's" for "W," that is to say, "double U." This bizarre spelling was considered by some in those days, it is said, to be "smart."

One stumbles in reading a word like "rise" for rice, "rere" for rare, "limmes" for limbs, "todes" for toads, and to a botanist "cinckfoile" seems indeed odd. The obsolete words look strange; "eftsoons" for soon is one. "Gisar of foule," while rather foreign in looks, becomes, after a little study, "gizzard of fowl." We meet with many words which look as though one ought to use them now; "misorder" in the following is one: "Wherefor it is better to preserve health by sobriety and temperance, than by surfit and *misorder.*" "Discommodities" for inconveniences and "dispraised" for discountenanced are two other examples. The modern verb "let" and its parts sound queer when used as a synonym for "hinder." Frequently one finds, in a single sentence, obsolete and living words of to-day, the latter however in a strange sense. Thus, in speaking of butter he writes: "Wherefore it is good for such as be commonly costive; and this experience I have of it, that some .... which eat no bread but *manchet,* by the eating of browne bread and butter in the morning fasting, (which is a Country mans breakfast), have beene made as *soluable* as if they had taken some purgation."

Vinegar made from ale is "aliger," while cider made from pears is "piery." "Oppilation" for constipation warns us that we would have to learn a new vocabulary if we were to converse with, and understand, our sixteenth-century *confrère,* on the value of cheese as a food.

We all know, through our reading along the lines of ethnology, that many living barbarous people consider the entrails of animals a great delicacy; the North American Indian has been described many times as eating the still warm small intestine of a freshly killed buffalo, deer, or steer, devouring it raw by the yard, as it were, deftly milking out its contents as a mere incident in the swallowing of the tid-bit. Coghan gives a hint of the survival in England, at least in a modified form, of a similar habit, when he discusses the uses of the inwards of beasts as food, calling the small intestine "chitterlings."

With us to-day there still remains some trace of this custom, for we still eat sausage, do we not?

The most interesting parts of his strange vocabulary are the words which seem surface indications of the distinct, but then coalescing, linguistic streams, the Anglo-Saxon and the Norman, which have since flowed down the channel of time, merging as the English of to-day. Such indications are, for example, "milt" for spleen, "reines" or "reynes" for kidneys; "mo" and "moe" for more are true middle English words which make us think of the negro pronunciation of more. The possessive is formed in three ways, "Noah, his floud," Noah's floud," and the "floud of Noah." While we have delved very briefly into this fascinating side issue, even this little takes us back to the plastic and formative period of our tongue, making us realize anew that the way has been long to this our day of condensed, yet amplified and exact, English. In addition to these indications of age, there are the words about America in the foreword "To the Reader" which are even more striking, to wit: "Whereas now through the providence of God, and the travaile of men, there is found further in the West, as it were a new world, a goodly countrey named *America,* or new India, for largeness, plenty, wholesome and temperate ayer, comparable with Affrike, Europe or Asia."

This old volume gives many examples which go to prove anew the truth that "history repeats itself"; the following quotation, with a little alteration, might well be taken for the warning recently ascribed to one of our captains of finance:

And what commodity a good warraine of Conies bringeth toward the keeping of a good house, men of honour and worship that love hospitality doe well know. Which vertue being acceptable to God, and a singular benefit of all the country round about them (the more it is to bee lamented) is every day more and more neglected in England. The chiefe cause thereof (as wise men think) is wastefull and sumptuous apparell, now commonly used in every degree farre otherwise than *William Rufus* did, who being a kings sonne and the second king of this land after the conquest, was thought to exceed, when he bestowed a marke upon a paire of hose, using commonly to bestow but three shillings.

Likewise a loud complaint of this day had its counterpart three hundred years ago, a fact plainly seen when we read in the preface to the use of fish, remarks as follows: "This much of flesh. Now concerning fish which is no small part of our sustenance in this Realme of England. And that flesh might be more plentifull and better cheap, two days in the weeke, that is Friday and Saturday, are especially appointed to fish." We can join hands with our professional brother of three hundred years ago, and lament with him over the price of meat.

One can well believe that the drift of human conduct has not changed much in all these years, when one finds that Coghan waxes warm over those obstinate people who will not avoid infection, on the ground that one will have a disease sooner or later, and it might as well be first as last.

The book shows strikingly how deeply rooted in the past are some common customs of to-day, little things which are so trivial that no one thinks of them in any way but as things of the moment. We all know how often one is told to smell of bread if one tends to sneeze on smelling mustard. The same advice is in this book. And so is the advice to toast cheese before putting it in a trap, the better to entice rats.

The same vanities were then as now, for we find Dr. Coghan remarking on the custom of young girls drinking vinegar to make the complexion pale.

"Cummin seeds sodden in water, if the face be washed with the same, doe cause the face to be clearer and fairer," all of which shows that women, perhaps men too, had an eye to complexions, and were wont to consult a favorite physician on such important matters.

Familiar stories and jokes appear, even in this medical book; the drunkard's wish for a giraffe's throat bobs up, only it is a crane's gullet that is desired this time; and the ostrich story is at hand, but it is the mullet which hides its head when Coghan tells the tale.

As one reads, one finds two particular vanities cropping out, one a national and one an ethnic; Coghan thought, as do many Englishmen to-day, that his country was superior to all others, and there are many expressions in his writings which, through him, exhibit the ethnic belief that man is of different clay from the brute.

Dr. Coghan's long experience as a teacher seems to have fixed in his mind many definite ideas concerning students; they were not a very robust lot and were bothered more or less with weak digestions. He seems to think he knows why so many students fail to achieve success: "The excess of wine is the cause . . . . why few young men that bee students, come to profound knowledge and ripenesse in these days"; and to avoid such a harrowing possibility, the following advice is written: "But I advise all students, such as bee students *nomine et re*, because they have commonly feeble braines, if not by nature, yet through study, to refraine from strong wines, because they distemper the braine, and cause drunkennesse ere a man bee ware." Our worthy author may have been no novice in Bacchus, for he says that cold water hinders digestion because it "cooleth the stomach overmuch. . . . The like effect it hath . . . . . when thirst happeneth after drinking of much wine." One might imagine this candid old practitioner comparing notes with Eugene Field when they met in the Beyond, for Field's verses on the Clink of the Ice in the Pitcher would surely appeal to him. "Katzenjammer" was evidently not an unheard-of thing in Coghan's days.

The book has running through it a vein of piety, which, it seems to me, is quite genuine; notwithstanding this attitude towards things religious, our author does not hesitate to pay his respects to clergymen and priests, in a way which was perhaps not to their liking.

Because of good Wine, more than of any other drink, are engendered and multiplied subtile spirits, clean and pure. And this is the cause (saith hee) why the divines that imagine and study upon high and subtile matters, love to drink good wine.

Assuming that there was no other information available, would this old tome help to throw light on the natural history of England as it was in those days? Indeed it would; it tells us that the wild ox (the present Chillingham Park cattle) and the wild boar still roamed in England; in fact, we can assume that both were common enough to be considered as possible sources of food; we should also learn that deer, hare and rabbits were frequently used as food, though it might bother us a bit to determine what a "conie" was, did not the author use the word synonymously with rabbit. We should learn, too, that paleolithic man's habit of breaking the long bones to extract the marrow had survived to Coghan's time, since we find him writing of the uses of bone marrow as food; by the same page we learn that he did not wholly differentiate between the long bone marrow and the spinal cord, for he says that the "marrow that cometh downe the backe bone is of like nature to the braine."

One of man's most anciently rooted beliefs comes to light again in this volume: An enemy's courage is in his heart, eat his heart and acquire his courage. It is but a step to apply this doctrine to the different organs of animals and the functions of such organs.

"The stones and udders of beastes being well digested doe nourish much, but the stones are better with their moystnesse, the udders cold and flegmaticke, they both doe increase seed of generation." Thus is added one more to the already long list of those who anticipated Brown-Sequard by generations.

Coghan's list of birds, included in the chapters on food, was of especial interest to me, and a very instructive one too; from it we learn that he and his contemporaries knew of, and used as food, "Fesaunt, Partrich, Wood Cock, Pigeons, Turtle Doves, Queales." We see moreover, that this schoolmaster physician believed that "Queales" furnished the meat rained by Jehovah for the Israelites while they wandered upon the desert. We also find that in England, small birds, such as sparrows, were employed for food, as they are to-day in southern and middle Europe, *i. e.*, starlings, blackbirds, lapwings, moor hens, wagtails, robin red-breast, larks. All are birds which most of us nowadays would not only scorn to touch as food, unless driven to it by dire distress, but would feel a pity that such useful and genial species should be killed to so little purpose; many game birds are included in Coghan's list, such as geese, swan, mallard, teal, shoveller, wigeon, plover, and so also many which are quite beyond the pale of civilized beings—herons, cranes, "buttorns" (bitterns). One exotic species, long acclimatized, in England, the peacock, and another, introduced surely not more than half a century before the Haven of Health was written, the turkey, are both mentioned. No one can tell whether Coghan was personally familiar with all the birds in this ample list, or not; we can see, however, that in some respects his ornithology was not much worse than that of White of Selbourne fame, for the latter believed that swallows hibernated in swamp mud during each winter, while the former had a most fantastic conception of the zoölogic relations of the puffin. Let him tell us about this bird: "There is also a kind of fish called a Puffin which in respect that it liveth altogether in the water, may be accounted a fish; whereas otherwise considering that it is feathered and doth flie, as other foules doe, it may seeme to be flesh, except that you would account it as a Syren, or mermayden, that is halfe fish and halfe flesh." Perhaps this was all book knowledge. Who knows?

That England, an island, and a maritime nation, utilized to the utmost its fresh-water, littoral, and deep-sea fishes, and knew them well, is abundantly attested by the list of fishes given in this book. In this list of thirty-nine fishes, there are many which I never heard of, and many others known to me by name only. In addition to this notable list one must add oysters, mussels, shrimps, crabs, lobsters and cockles.

The plants given for foods and medicines make a long enumeration, there being over one hundred, not counting the plant products, fruits, nuts and spices. These various vegetables, fruits, and condiments would betoken, inferentially, a considerable degree of luxury, yet outside of quite circumscribed city and castle circles, all was rough, rude, and

hearty. The rural people met in mass but seldom, and then usually at fairs, when a whole ox might be roasted out-of-doors, the prototype of our Western barbecue. Negative evidence is frequently as interesting as positive; in this long list of vegetable products, compiled and elaborated with evident care, no mention at all is made of the now almost cosmopolitan American products, the potato and Indian corn, probably because then they were only becoming known.

From a medical point of view the key to the whole book is the quotation on the title page; though much of the context of the various chapters may seem silly to us, there still runs through all of the fabric woven by Coghan, a warp of admirable instruction as to diet, drink, and other factors in the preservation of health. In his descriptions of the cooking of foods he shows that the primitive custom of cooking meats and vegetables in earthen vessels still held in England. As one reads his directions about various articles of diet, unexpected facts come to light. It appears that violets were then used as spinach is to-day; one is surprised to find that he seems to have, though something of a *bon vivant* himself, a low opinion of bacon; this may have been because the finished product then was far from what it is to-day.

Astrologic lore crops out when he writes under the caption of "cibus": "Shell fishes be at the best when the moon increaseth as the Poet Horace noteth."

That customs are tenacious of existence, notwithstanding that they be transported across wide seas, and through spaces of time, is shown by the use then, and now, of rice, milk, and cinnamon, all mixed together.

Dr. Coghan's experience made it clear to him that different individuals are suited each to his own kind of exercise or labor. He also carefully differentiated between exercises useful for different parts of the body. Thus he especially commends "tenis," perhaps because Galen had done so, or had at least recommended a game that Coghan called "tenis," and which may have been like modern hand ball.

The extended division on "cibus" is a forceful reminder, in parts at least, that dietetic wisdom did not begin with us and our experimental laboratories. Let us read what Coghan says about the quantity one should eat: "That it be according to the nature of him that eateth, and not always according to appetite. For the temperate stomacke only (which is rare to bee found) desireth so much as it may conveniently digest. Contrariewise the hot stomacke doth not desire so much as it may digest. The cold stomacke may not digest so much as it desireth. Wherefore, the surest way in feeding, is to leave with an appetite, according to the old saying, and to keep a corner for a friend." Surely there is wisdom and good advice in this, even though the same may have been said many times before, and since.

In several places there is expressed a decided preference for fowl, domestic or wild. He sings the praises of "fesaunt" this way: "Fesaunt exceedeth all foules in sweetness and wholesomeness, and is equall to a Capon in nourishing but is somewhat dryer, and is of some men put in a meane between a henne and a partrich. It is a meate for Princes and great estates, and for poore schollers when they can get it."

His classification of diets, you will surely agree with me, is not without humor:

> **Full diet is much enough,**
> **Mean diet is enough in a mean,**
> **Slender diet is little enough.**

There must have run a streak of the epicure through this physician, for he waxes warm over the praises of a good cook and good cooking; "A good cooke is a good jewel and to be made much of, *modo fit vir bonus,*" and this is exemplified again when he writes, "because cookery is part of physicke and a good cooke (as Dr. Broad saith) is halfe a physitian."

When Coghan advises "Poor Schollers" that "Great suppers and late suppers must bee banished from all healthful houses," mayhap he had companies like this in mind. If by chance we eat too much despite his advice, we can find consolation and a present relief in his suggestion that "if thou feel that thou hast eaten too much, arise, goe thy way, cast it out of thy stomacke, and take thy rest, and it shall ease thee, so that thou shalt bring no sickness into thy body."

Last fall a cowboy said to me as I was on a cattle drive, "I believe it does a man good to get drunk once in a while, say once a month," a notion much older than I, at the time, realized, for it is fully amplified in this book, when it says: "Yet I read in *Arnoldus* upon *Schola Sal.* that surfetting and drunkenness is sometimes expedient, because thereby we fall to vomit, whereof ensueth cleansing of the stomacke, and preventing of many ill diseases of long continuance." This notion is not, however, to the satisfaction and approval of Coghan, who once more shows sound sense in matters dietetic when he quotes, with approval, his admired medical forebears:

> **But to procure vomit, through excessee and drunkenness, as it is ungodly, so it is beastly; and doth more hurt the stomacke, the braine, the brest, and all parts of the body, than it doth profit. . . . . .**

Much as he seemed to have valued wine in moderation and to have condemned it in excess, his opinion of a total abstainer is unique, which I will read to you: "And this is the cause (as I thinke) why men by nature so greedily covet wine; except some od *Abstemius,* one amonge a thousand perchance degenerate, and is of a doggish nature, for dogges of nature doe abhorre wine."

Mingled with his directions how to drink, and how to choose strong drinks, are indications of his notions of physiology, and theories of disease. Thus he says:

> That is to say we ought to drink moderately, so that the stomacke be not hurt thereby, nor drunkennesse caused; for much abundence of drink at meales drowneth the meat eaten, and not onely letteth convenient concoction in the stomacke, but also causeth it to pass faster than nature requireth, and therefore engendreth much flegme, and consequently rheumes, and crudenesse in the veines, debility, and slipperinnesse of the stomacke, continuall flux, and many other inconveniences to the body, and members.

There are many curious sayings in his discourse on milk, which would be of keen interest if read *in extenso,* but we will have to content ourselves with an excerpt or two. Milk, according to him, is blood twice concocted, and it is of great use for "them that bee wasted, or in a consumption, or be leane." For woman's milk he has the highest praise only: "Yet common experience proveth that womans milke sucked from the breast is without comparison best of all in a consumption. Wherof a notable example was shewed of late yeares in the old Earle of Cumberland, who being brought to utter weakeness by a consuming Fever, by means of a womans sucke together with the good counsaile of learned Physitians, so recovered his strength, that before being destitute of heires male of his owne body, he gate that most worthy gentleman that now is inheritour both of his fathers vertues and honour."

While Coghan gives extended space and much attention to strong drinks, and is decidedly not a total abstainer, he also is loud in his praises of water as a beverage; passing over all of this, though it be of real interest, let us read what his tests of a good water are: "First by the lightnesse, for the lightest is best. Secondly by little skim or froth in boyling. Thirdly by drenching of linnen clothes in the water, and laying the same to dry, for that which is soonest dry, sheweth the best water."

This being a modest and polite gathering, and the reader a bashful man, the chapter on Venus will have to be passed over most hastily; Coghan's humor comes to the surface in it, more than in any other one in the book. To digress a moment I may say that in speaking of fishes, he plays on words, and says, "And the tongue of a carp is very pleasant to carping Ladies." Likewise under the head of trout he is again facetious. "This fish by nature loveth flattery; for being in the water it will suffer itselfe to bee rubbed and clawed, and so to bee taken. Whose example I would wish no maides to follow, lest they repent after claps."

One reads with amusement the following disapproval of early marriages:

> that the woman at twelve yeares of age, and the man at fourteene, are marriageable, which thing is the cause that men and women in these dayes, are both weake of body, and small of stature; yea in respect of those that lived but forty years agoe in this land; much more then in comparison of the ancient inhabitants of *Britaine*, who for their tallnesse of stature were called *Gyants*.

The extraordinary sexual capacity of the house sparrow of England must long have been current knowledge in that period, for Shakespeare speaks of it in his plays, and Coghan mentions it in these words:

> And this is the cause why such as use immoderate *Venus* be short lived, and as the Sparrowes, through incontinency, consume themselves.

Along a similar line of thought he cautions against the use of sparrows as food because "they stirre up Venus, especially the Cocke sparrow." Having shown that there are dangers in worshiping too devotedly at the shrine of Venus, he also remarks on the evil effects of being continent.

Perhaps it will be useful to this meeting to learn how to abate carnal lust:

> Last of all to conclude these meanes whereby to abate carnall lust, I will recite certaine examples gathered out of our English Chronicles of some men in time past, who supposed all chastity to consist in single life. *Elphlegus*, Bishop of Winchester, put upon him *Duntanes* a Monkes apparell, that hee might thereby avoid both the fire of concupiscence and the fire of hell. *S. Petrock* an hermit of Cornewall, was faine every night from the crowing of the cock to the spring of the morning to stand naked in a pit of water to abate the movings of his flesh, yet could he never have remedy of that disease, untill he went on pilgrimage to Rome and Ierusalem. *S. Aldelme* Abbot and Bishop of Malmsbury, when hee was stirred by his ghostly enemy to the sinne of the body, would hold within his bed by him a faire maiden so long time as hee might say over the whole Psalter, to the intent to doe the more torment to himselfe and his flesh. These men (as you see) as holy as they seemed, were yet captives to *Cupid*, and could hardly get loosed out of his bands, or whether they were loosed at all, it may be doubted. . . . .

His views, on the other hand, of the beneficial results of exercising this primal function are not without interest: "For it procureth appetite to meate, and helpeth concoction, it maketh the body more light, and nimble, it openeth the pores and conduits, and purgeth flegme, it quickneth the mind, stirreth up the wit, reviveth the senses, driveth away sadnesse, madnesse, anger, melancholy, fury."

It is touching to witness the extreme solicitude this good old chap had for his students and scholars. Thus he says that to abate concupiscence the best, in his judgment, "is for a man to keep himself out of the company of women."

One naturally asks, while and after reading this book, what sort of a physician this man was. We have seen, through the quotation from his biography, that he was esteemed a good physician. Can we find evidence of this in his writings? One cannot be very critical in this attempt, for the avowed purpose of the book in hand, clearly put forth in many places, is along the lines of prophylaxis, and hence it can hardly be expected to show the writer's merits as a clinician.

There was, in Coghan's time, really no science of any sort, much less any systematized knowledge of medicine which, under the most liberal construction, could be called a science of medicine. While the germs of our so-called present-day science of medicine were developing at that time, there had been little or no advance to speak of in the study of medicine, especially in anatomy and physiology, from the third century on to about the time of Coghan's life. He was clearly a follower of Galen, in so far as one can judge from his therapeutics; he used simples, and mentions nowhere in his discourses any inorganic as a medicine, though he knew of Paracelsus, specifically mentioning him on page 180, and presumably knew of his views and of his strong predilection towards salts, and other chemical agents. Moreover we can feel further confident of his admiration of, and faith in, Galen, since he quotes the latter most extensively; he also quotes numerous other older medical writers, being familiar with such parts of

the Arabian school (aside from its Galenic features) as would be transmitted by Avicenna's writings. Whatever he may have thought of the teachings of his own immediate medical predecessors, and contemporaries, we can be sure that he was not misled by the false notion that drugs were a *sine qua non*, though some words of his would imply that he did think medicine was indispensable; he had, unquestionably, great faith in the medical art of his day, but he also clearly discerned that there is such a thing as the *vis medicatrix naturæ*. His book shows in itself, and in its thesis, his appreciation of the surpassing importance of prophylaxis, a thing redounding very much to his credit, when we consider the state of medical knowledge at his period. If, before reading the Haven of Health, one had forgotten all about the humoral theory as expounded by Hippocratic physicians and the temperament theory as held by followers of Galen, he would soon be reminded of these ancient beliefs, by page after page of Coghan's writings. There is, however, less of the humoral theory in the book than of Galen's theory of temperament. Almost everywhere one finds that Coghan, in describing foods, carefully gives the degree of heat or cold, and of moist or dry. "Mallowes are hot and moist in the first degree," whereas caraway "is hot and drie in almost the third degree."

"Concoction" was a well-worn word with him as it was with many of his contemporaries and successors. What we should say was digested he says is "concocted," and as we have already seen, his conception of the secretion of milk has to be expressed by the same word; that is, "milk is made of bloud twice concocted." His knowledge of the character of different parts of certain foods was hazy, and naturally often incorrect. For example he mistook the thermo-coagulable albuminoid of milk for a second kind of cream.

What we term physiology was with him non-existent; nevertheless he tries to explain numerous different physiological processes. On page 279 we have the following example, to wit:

> Now to enter more deepely into the nature of mankinde . . . you shall understand, that as every living creature doth feed, and as the meat received is altered and changed three times, that is to say, in the stomacke, liver, and parts before it nourish the body, and as every concoction hath his superfluity, or excrement, as the stomacke ordure, the liver urine, the veines sweate.

This may sound strange, yet it is simple when compared with his explanation of sleep: "for here is shewed by what meanes sleepe is caused. That is, by vapours and fumes rising from the stomacke to the head, where through coldnesse of the braine, they being congealed, do stop the conduits and wayes of the senses, and so procure sleepe."

The book has many suggestions commanding wholesome respect, advice of help through all time; listen to this: "Man feeds to live, and liveth not to feed. Yet a reasonable time to eat in is necessary, for to eat overgreedily, and to snatch up our meat hastily, is hurtfull, and hindereth concoction; and to chew our meat well and to swallow it downe leisurely, is a great furtherance to the well digesting of the same. And indeed, it is the very end and purpose why the teeth were ordained."

The following quotation will give some inkling of his beliefs about the digestion of meat, and, too, how the Galenic terms of heat or cold, moist or dry, were applied: "But here in England where we feed on divers sorts of meates at one meale, the order commonly is thus; that first we eate pottage or brothes, then boyled meates, after that rosted or baked, and in the end cheese and fruits. . . . And next I say, that for as much as our stomacks in England most commonly be hot and cholericke, that grosse meats be most convenient to be eaten first."

We to-day eat cheese with pie, because it is a convention; this convention probably arose because of the notion that cheese aided in the digestion of pie, and perhaps it is a direct descendant of the belief expressed by Dr. Coghan when he says: "First it [cheese] strengtheneth a weake stomacke. Secondly it maketh other meates to descend into the chief place of digestion, that is the bosom of the stomacke . . . . ."

It is rather difficult to estimate how much he realized the truth of his remarks when he warns against the use of fish taken from muddy waters, and advises the use of fire to destroy contagion. In the brief outline on how to avoid the plague there is much wisdom, and the same may be said of his directions how to avoid gout. Here and there in the book one glimpses a dim conception of immunity: "for they that come out of a pure aire into a corrupt ayre, are in greater danger than they that never fled away."

There is only one attempt in the whole book to describe a disease, a description which, seemingly, gives a picture of an epidemic of typhoid fever occurring in 1522, this date making his description probably a second-hand one.

It is curious how clearly two very divergent strains run through his medical ideas; he is very sound about diet, exercise, moderation, etc., and on the other hand many of his conceptions of therapeutics are ludicrous; perhaps because he could not analyze and separate the effects of drugs, and could check up the good results of proper diet, and exercise; and in all this he probably did not wholly realize how much physicians are aided by nature. Of his mistaken ideas, we may mention his feeling that yellow jaundice and worms are dangerous without medicine, and that a pleurisy is present death "without blood letting."

Many of our contemporaries believe, as he did, in the successful solvent treatment of renal and vesical stone. Perhaps there is truth in this; certainly there seems to be truth in his theory that certain kinds of food predispose to, and promote the formation of, calculi.

Any undue credulity he may have exhibited is excusable, for he lived when there was little or no tendency to study cause and effect; when Coghan writes that sage is of use "because it is good against pleurisies, and comforteth the sinews and Braine, it must needs bee for Students, who are commonly cumbered with diseases of the head," and that hare's brain is good for "shaking of the limmes, which is called Palsie," one must not feel that he is to be classed with the

thin-witted people who built theories of dilutions and potentizations, and their wonderful effects. He was simply repeating the errors which were a heritage from an even more credulous ancestry. We must overlook this, and give him credit for the many sound bits of advice he deals out in this book.

Let us see what kind of a prescription he writes, if what is here given may be called a prescription; these are the directions for making "*aqua composita*":

Take of Sage, Hisop, Rosemary, Mint, Spike, or Lavender leaves, Maierom, Bay leaves, of each like much, of all foure good handfulls, to one gallon of liquor. Take also of Cloves, Mace, Nutmegs, Ginger, Cinamome, Pepper, Graynes, of each a quarter of an ounce, Liquorise and Anise, of each halfe a pound: beate the spices grosse, and first wash the herbs, then break them gently betweene your hands. Use the Liquorise and Anise as said in *Aqua vitæ*, then put all together into a Galon or more of good Ale or Wine, and let them steep all night close covered in some vessell of Earth or Wood, and the next morning after distill them as you doe *Aqua vitæ*.

We look in vain through this work for indubitable evidences of a belief in, or use of, charms and kindred relics of barbaric medicine; there are several passages which imply a belief in astrology, though all of this may have been included on the authority of his predecessors, which would not necessarily carry with it his own personal approbation. As an example of undue faith we may instance his apparent approval of Dr. Steven's Water, a decoction of wine, ginger, galingale, canel, cinamom, nutmeg, greyns, cloves, mace, annis, fenel, caraway, sage, mint, red roses, time, pelletory of the wall, wild maierom, rosemary, wild time, camamel, lavender and avens, all distilled in a "Limbecke" and useful because "It comforteth the spirits, and preserveth greatly the youth of man & helpeth inward diseases comming of cold, against shaking of the palfery, it cureth the contraction of sinews, and helpeth the conception of women that be barren, it killeth worms in the belly, it helpeth the cold gout, it helpeth the tooth ach, it comforteth the stomacke very much, it cureth the cold dropsie, it helpeth the stone in the bladder, and reynes of the backe, it cureth the canker, it helpeth shortly a stinking breath, and who so useth this water now & then, but not too often, it preserveth him in good liking, & shal make one seeme young very long."

There are also hints that there then existed in England relics of very ancient savage medicinal agents; Coghan speaks of the use of the "lungs of fox, pulverized for preserving the lungs," and of an "electury" which he calls "Loche de Pulmon Vulpis"; in an analogous class is a famous remedy long used by orientals, called "Triacle," a compound made under conditions of great mystery and ceremony, and containing, besides many other ingredients, portions of vipers. If one can believe what Coghan said about this remedy, it must have been a boon to suffering humanity. "Yet this much I dare say by the authority of Galen . . . . that no one medicine is better, either to preserve from the plague, or to expell the venome the principall parts in such as be infected, than Triacle, and is not onely good in the plague, but also in all other poysons, and noysome drinks; yea, and in most parts of other diseases, as the Cough, the Cholicke, the Stone, the Palsie, the Jaundice, the Ague, the Dropsie, the Leprosie, the Headache . . . . ."

It would be most unfair to look upon this side of the shield only; if he believed such things, and we cannot be sure he did, nevertheless they did not preclude his having faith in things of manifest helpfulness. He advised the use of cold drinks for fever, which places him far in advance of some medical men who practiced only sixty years ago. He also clearly recognised the very important fact that abstinence from food was indicated in some diseases, for he writes: "Yet in sickness sometimes a slender diet is necessary, especially in *Morbus aculis*"; and he knew that depletion was to be had in several ways. Fasting "is next in force to blood letting."

The chapter on the plague ought to give us some measure as to his abilities as a clinician, but it must be confessed that it reveals little; we can certainly agree with his advice that plague patients should consult, and secure the aid of, learned physicians and surgeons.

Coghan believed thoroughly in the infectivity of plague, through personal channels or fomites, and in the wisdom of avoiding all avenues of infection; there are signs in his writings that he had a more or less clear conception of the fact that there were differing degrees of infectivity.

What shall be said of the book now that it is read? It is surely genuine in its efforts to give good advice, and advice only along the lines put forth in the thesis as being for "all those that have a care of their health," while the generous credits in the text show a total lack of pretentious claims to things not his own.

As for the man, one can say that he creeps into one's affections, an honest, clean and God-fearing figure, endowed with something of the seer in that he felt the predominant importance of prophylaxis, and the value of health.

Without any other characteristics, he would be notable beyond his time and generation in that he clearly recognised that every man is a law unto himself:

So I say, notwithstanding that every rule prescribed in this booke cannot agree with every mans complection, yet the rules are not to bee disallowed, but to bee followed accordingly as every man shall finde them good and wholesome in himselfe. And this is the best Physicke of all for every man, to know thoroughly the state of his own body, and to mark diligently what things are wont to doe him good or harme.

THE JOHNS HOPKINS HOSPITAL BULLETIN.

The Hospital Bulletin contains details of hospital and dispensary practice, abstracts of papers read, and other proceedings of the Medical Society of the Hospital, reports of lectures, and other matters of general interest in connection with the work of the Hospital. It is issued monthly.

Volume XXII is in progress. The subscription price is $2.00 per year in the United States, Canada, and Mexico; foreign subscriptions $2.50.

NOTES ON NEW BOOKS.

Litora Aliena. By MEDICUS PEREGRINUS. Price, 50 cents. (*Boston: W. M. Leonard, 1911.*)

A small paper bound volume of letters sent to the Boston Medical and Surgical Journal, by one of its editors, while traveling in England and on the Continent. He writes of things medical as well as of objects with other interests, and a pleasant half hour can be spent, when one is tired of serious reading and hard thinking, in glancing through these views of foreign countries with their various attractions.

A Treatise on Diagnostic Methods of Examination. By PROF. DR. HERMANN SAHLI, Director of the Medical Clinic, University of Bern. Edited, with additions, by NATHANIEL BOWDITCH POTTER, M. D., Asst. Professor of Clinical Medicine, College of Physicians and Surgeons, New York. Illustrated. Price, $6.50. (*Philadelphia and London: W. B. Saunders Company, 1911.*)

The admirable work, first reviewed in the BULLETIN, April, 1907, now appears in an enlarged form, improved by the careful editing of the author. This edition is a translation of the fifth German edition, and is therefore fully up to date, and most valuable for all students.

State Board Questions and Answers. By R. MAX GOEPP, M. D., Professor of Clinical Medicine at the Philadelphia Polyclinic. Second Edition Revised. Price, $4.00. (*Philadelphia and London: W. B. Saunders Company, 1911.*)

Questions on serum and vaccine therapy, serum diagnosis and treatment of syphilis, chemotherapy, diseases due to intestinal parasites and other tropical disorders, the new heart-physiology, the myogenic theory and the graphic methods of studying the phenomena of the circulation have been added to this edition. When it first appeared, the book was reviewed in our issue of August, 1908. Except for these new additions the work practically remains as it did then.

The Principles and Practice of Modern Otology. By JOHN F. BARNHILL, M. D., Professor of Otology, Laryngology and Rhinology, Indiana University School of Medicine, and ERNEST DE W. WALES, B. S., M. D., Clinical Professor of Otology, Laryngology and Rhinology, Indiana University School of Medicine. Second edition revised. Illustrated. Price $5.50. (*Philadelphia and London: W. B. Saunders Company, 1911.*)

The merits of this book were commented upon in this journal in May, 1908, its first-class illustrations and "the attention paid to all the little details of clinical study and care of cases." The new edition differs only slightly from the first—some chapters have been rewritten or revised, and with a few additions the book has been made useful by being brought up to date.

A Manual of Physical Diagnosis. By BREFNEY ROLPH O'REILLY, M. D., C. M. Demonstrator in Clinical Medicine and in Pathology, University of Toronto, etc. Illustrated. Price $2. (*Philadelphia: P. Blakiston's Son & Co., 1911.*)

To the medical student about to enter upon his duties as clinical clerk in the hospital ward and to the general practitioner who has become "a little rusty" in the methods employed in diagnosis of a medical case, Dr. O'Reilly's "Manual of Physical Diagnosis" will prove of considerable value.

While numerous books along similar lines have recently appeared, there are several features which make this little book of much practical value.

Beginning with a chapter devoted to the taking of a clinical history the author treats in chronological order the methods employed in the actual examination of a patient. Under "general inspection," we find first noted that which is, as a rule, almost too obvious to mention and for that reason, often overlooked, a careful discussion and tabulation of the various gaits and facies exhibited by the patient.

Special inspection is given to the skin, head and extremities. According to the findings on inspection, palpation, percussion and auscultation each system, respiratory, circulatory and digestive are carefully reviewed.

The chapter devoted to the circulatory system has considerable space given to the instrumental methods of examination and contains much of the newer light thrown on the study of the heart by Dr. James Mackenzie, and also reproductions of his excellent cardiograms. The latter half of the manual is devoted to a fairly comprehensive outline of the ordinary laboratory technique which one needs to use in the examination of a medical case.

J. S. B.

The Racial Anatomy of the Philippine Islanders, Introducing New Methods of Anthropology and Showing their Application to the Filipinos with a Classification of Human Ears and a Scheme for the Heredity of Anatomical Characters in Man. By ROBERT BENNETT BEAN, B. S., M. D., Associate Professor of Anatomy, the Tulane University of Louisiana. With nineteen illustrations reproduced from original photographs and seven figures. (*Philadelphia and London: J. B. Lippincott Company, 1910.*)

The Racial Anatomy of the Philippine Islands is the outcome of studies in anatomy begun in the Medical Department of the Johns Hopkins University some years ago which have been continued since wherever the author has found material to study, mostly in the Philippines. In his examination of more than 4000 persons during this investigation he has sought for definite types which, in his judgment, will justify him in distinguishing different races by their anatomical pecularities. These types are recognizable by ear form, cephalic index, nasal index and other factors so that they can be studied by families through several generations in order to establish their hereditary characteristics. He finds two predominant types of races in the Philippines, the "Iberian," which seems to have originated from a mixture of the Spanish, and the native races which he terms the "Primitive." From these, giving rise to a race like the Eurasian in India, by various mixtures and environmental conditions, such as climate, soil and altitude, the author gets a variety of races to which he applies varying names like "Modified Primitive," "Australoid," "Alpine," "B. B. B." (Big-cerebellumed, box-headed Bavarian), "Adriatic," "Cro-Magnon" and Blends—the "B. B. B." and "Cro-Magnon" resembling the Iberian, and the "Alpine" and "Adriatic" resembling the Primitive. The volume contains an account of the author's study of these races in the Philippines in order to determine the proportions which exist in various portions of the Archipelago. We find many interesting details respecting the Benguet, Lepanto and Bontoc Igorots, the criminals and outcasts at Manila, the men and women of Laytay and the men of Cainta. The work of classifying these diverse elements has been done with great care and industry and the author deserves all praise. It seems probable that farther study and larger observations will be required to determine how practical this new method of anthropological study may prove. Its methods are painstaking, thorough and accurate. It is a source of regret to all interested in the subject that ill-health required the author to relinquish his studies in Manila.

The chapter entitled "The Relation of Morphology to Disease" is of extreme interest because of the relation of race form to

disease incidence. Thus, at the Malecon morgue, 70 per cent of the Iberians, 56 per cent of the Blends and 33 per cent of the other types died of tuberculosis, whereas only one Primitive and not a single Australoid died of it. Further investigation showed that the Iberian was much more susceptible to all other diseases than the Primitive. "This may be indicative that the European and Filipino offspring of the Iberian type is less resistant to disease in the tropics than is the aboriginal type on its own soil and in its natural environment." The author infers that a process of breeding out an alien stock is in progress. Although the Iberian stock has been added to the Primitive stock by repeated migrations, it does not retain its vigor when mingled with an aboriginal people in a new environment and succumbs to diseases like tuberculosis more easily than the original stock which has become suited to its habitat.

The author has brought much new and valuable material to aid the study of Anthropology and has added materially to our knowledge of the Filipino races.

New and Nonofficial Remedies, 1911. Containing descriptions of articles which have been accepted by the Council on Pharmacy and Chemistry of the American Medical Association, prior to January 1, 1911. Price, paper, 25 cents; cloth, 50 cents. Pp. 282. (*Chicago: Press of the American Medical Association.*)

This book, bound in paper, is furnished free to all members of the American Medical Association, but the reprint in book form is valuable for pharmacists, chemists and others. It differs from the first edition essentially only by the addition of more pages to describe new articles accepted by the Council during 1910. It would, on the whole, seem better than reprinting the entire volume annually to simply publish a small pamphlet of the new articles. The appearance of this work was noted in our issue of June, 1910, and it is a satisfaction to again call attention to this important publication.

Scientific Memoirs. By officers of the Medical and Sanitary Departments of the Government of India. New Series No. 40.
The Destruction of Fleas by Exposure to the Sun. By CAPTAIN J. CUNNINGHAM, M. D., I. M. S. Price 9d. (*Calcutta: Superintendent Government Printing, India, 1911.*)

In a brief report of some carefully carried-out experiments Dr. Cunningham proves that fleas are rapidly killed in garments when exposed to the sunlight at a temperature of 120° F. That the method of exposing the clothes on a surface of sand may be used with success for this purpose is doubtless a useful discovery, but its practice must be limited. It is well, however, for all sanitarians to have their attention called to this report, as the system advocated is so simple.

Plaster of Paris and How to Use it. By MARTIN W. WARE, M. D., Adjunct Attending Surgeon, Mount Sinai Hospital, etc. Second edition revised, enlarged and illustrated. Price $1.25. (*New York: Surgery Publishing Company, 1911.*)

The excellence of this manual was called attention to in the issue of this journal of May, 1907. With some slight changes and the addition of more illustrations the author has succeeded in making it still more useful. It is a first-rate practical small handbook on the subject.

The Life History, Function and Inflammation of the Appendix. By ELDRED M. CONNER, M. A., M. C., F. R. C. S., etc. Price 1/. (*London: John Bale, Sons & Danielsson, Ltd., 1911.*)

In a short lecture delivered in Manchester (Eng.), during this year, the author propounds certain views as to the causation of appendicitis, and the use of the appendix, which seem strange—for instance that one of the great causes of the disease is the use of white bread, since this contains very fine bits of steel—microscopical in size—from the rollers with which the flour is ground. His view of the use of the appendix is that its lymphoid tissue throws out white cells to conquer either bacterial or other invaders. These ideas will require further proof before they can be generally accepted as correct.

International Clinics, Vol. I. Twenty-first Series, 1911. Price $2. (*Philadelphia and London: J. B. Lippincott Company.*)

A paper on pellagra, several on syphilis, two on poliomyelitis, one on typhoid fever, and others on surgery, ophthalmology, physiology, anatomy, biology and tropical medicine, etc., make this volume one of wide interest. In addition to the "Clinics" there is also a review of the "Progress of Medicine During 1910," which adds value to the work. Attention has been drawn so frequently to the character and scope of the "International Clinics," as well as to their merit that a few items of the contents are merely selected to show the variety of topics treated.

Diseases of the Nose, Throat and Ear—Medical and Surgical. By WILLIAM LINCOLN BALLENGER, M. D., etc. Third edition. Revised and enlarged. Illustrated. (*Philadelphia and New York: Lea & Febiger, 1911.*)

It is but a year ago since we had the pleasure of noting the appearance of the second edition of this excellent work. The book deserves its success, and the new edition is an improvement on its predecessor. The author has carefully revised his previous work and made it still better for students and practitioners.

Das Radium in der Biologie und Medizin. Von PROFESSOR E. S. LONDON, Leiter der pathologischen Abtheilung an K. Institut für experimentelle Medizin zu St. Petersburg. Mit 20 Abbildungen in Text. Preis 6 Mk. (*Leipzig: Akademische Verlagsgesellschaft m. b. H., 1911.*)

This is neither a text-book nor a hand-book, but merely a well-made compilation of the use and value of radium in biology and medicine. Until this pamphlet appeared no one seems to have taken the trouble to extract from the medical literature of all countries the many and varied reports on radium as a therapeutic agent, and here for the first time those who can read German have the opportunity to gather a clear idea of the general consensus of the profession on the uses of radium. The work is divided into A, the physical and clinical properties of radium; and B, the physiological properties of radium. Section B is subdivided into 4 parts as follows: 1. On the mechanism of the action of radium on living bodies; 2. Its action on bacteria, fungi, ferments, toxins and antitoxins, plants and lower orders of animals, process of embryonic development and regeneration, and on individual organs and tissues; 3. The general action of radium and its emanations on the higher orders of living beings; 4 Radium or Emanation therapy. There is a good bibliography, and a few illustrations.

Scientific Memoirs. By Officers of the Medical and Sanitary Departments of the Government of India. New Series No. 39.
The Applicability to Medico-Legal Practice in India of the Biochemical Tests for the Origin of Blood-Stains. By LIEUT.-COLONEL W. D. SUTHERLAND, M. B., I. M. S. (*Calcutta: Superintendent Government Printing, India, 1910.*)

This is a carefully prepared report, but as the title indicates, of interest only to a small number of the profession. Such experiments as were carried out by Dr. Sutherland add, however, to our general knowledge of biochemical problems, and from this department of the Government of India much valuable information has come.

The Practice of Surgery. By JAMES GREGORY MUMFORD, M. D. Visiting Surgeon to the Massachusetts General Hospital, etc. Illustrated. Price $7.00. (*Philadelphia and London: W. B. Saunders Company, 1910.*)

The author assumes the reader's preliminary training and therefore omits the consideration of the principles of surgery except incidentally. He endeavors to give an account of the practice of surgery as it is seen in the accident ward and operating room.

The plan of the book is unusual. In order to present the various subjects in their true perspective the author takes up surgical diseases in their order of interest, importance, and frequency, so far as he is able with due regard to sequence. He chooses appendicitis as the subject of the first chapter because appendicitis is the most conspicuous example of acute abdominal disease.

The book is divided into seven parts: I. The Abdomen; II. The Female Organs of Generation; III. Genito-Urinary Organs; IV. The Chest; V. The Face and Neck; VI. The Head and Spine; VII. Minor Surgery, Diseases of Structure.

There are numerous excellent illustrations, and the book is nicely gotten up. Many well-chosen references are given.

It is to be regretted that a number of interesting subjects are so briefly considered. The author has accomplished his purpose of presenting the practice of surgery as surgeons see it, in a most satisfactory way, and the book will be a very welcome and useful addition to the library of the operating surgeon.

J. S. D.

Dislocations and Fractures. By FREDERIC JAY COTTON, M. D. Illustrated. $6.00 (*Philadelphia and London: W. B. Saunders Company, 1910.*)

Very little need be said in a review of this work. One has only to glance through its pages to realize the thoroughness and detail with which the author has handled his subject. The text is clear and concise and is admirably elucidated by over twelve hundred cuts, every one of which has been selected with the greatest care. Indeed it is hardly necessary to read the text at all, so well do the drawings illustrate the various fractures, dislocations and methods of treatment.

In view of the fact that operative procedures as regards fractures are being looked upon with more and more favor, it is possible that a little more space given to this side of the subject might have added to the usefulness of the book. Dr. Cotton is certainly to be congratulated upon the success of his efforts.

BERTRAM M. BERNHEIM.

Diseases of the Skin. By JAMES H. SEQUEIRA, M. D., F. R. C. P., etc. Illustrated. Price, $8. (*Philadelphia: P. Blackiston's Son & Co.*)

Although the price of this book seems large it is well worth the money—the illustrations can hardly be bettered; the photographs are of exceptional excellence, and the "three color" pictures are remarkable in demonstrating certain lesions. But this is not the only merit of the work, which is an excellent textbook for students and the general practitioner. The description of the diseases is clear, concise and simple, and the treatment practical and rational. The author has not dwelt much on the pathology of the lesions, but after all, except for specialists, he has given enough to make it evident to any student what the fundamental underlying changes are due to, so far as is known. The references to the literature are well selected, and the book in all respects seems to be fully abreast of the times. It is certain to be well liked by students.

Year-book of the Pilcher Hospital. (*Brooklyn, N. Y., 1911.*)

The Pilcher Hospital was established a little over a year ago by Dr. Lewis Stephen Pilcher and his sons, and this Year-book is composed of a series of papers dealing with the surgical cases they have treated. Some of the articles have already appeared elsewhere, but a large number are new, and the Year-book, with a few illustrations, some of which are in color, is an evidence of the good work done by the Pilchers, and will be a stimulus to other surgeons, who have private clinics, to publish, either annually or at regular intervals, reports of the work done by them. The Mayos of Rochester have just issued a volume, and both these products are well worthy of note.

Burdett's Hospitals and Charities, 1911. The Year-book of Philanthropy and Hospital Annual. Twenty-second Year. 10/6. (*London: The Scientific Press, Limited.*)

It is always a satisfaction to receive this Annual which contains so much information on hospitals that is of value to all superintendents. The statistics furnished are well arranged and can be easily understood. To Sir Henry Burdett, the editor, a great deal of the progress in hospital administration is due. The life of charity institutions depends on the good management of their finances, and he it is who has so persistently, now for twenty-two years, drawn the attention of hospital administrators to the economies that can be practiced, by showing in comparative statistics, the different sums spent, for the same service practically, in various hospitals. To England his work must have been of incalculable value, and as stated above, superintendents in America can benefit themselves by a careful study of his reports, which are a mine of information on questions relating to hospitals, asylums, sanatoria, etc.

Chemistry of Food and Nutrition. By HENRY C. SHERMAN, Ph. D. (*New York: The Macmillan Company, 1911.*)

Many books appear yearly on this subject and few of them are good, so that it is a real pleasure to call attention to Dr. Sherman's work, which is excellent; a serviceable book for the laity, who have some knowledge about digestion, as well as for students. While not entering too deeply into the chemistry the author gives a thoroughly satisfactory review of the best modern ideas of the metabolism of food in the human body and a clear statement of the proper food requirements for a normal individual. It is reliable and not too long nor too technical. Its success is assured.

Plastic and Cosmetic Surgery. By FREDERIC STRANGE KOLLE, M. D. Illustrated. (*New York and London: D. Appleton & Co., 1911.*)

The author says the importance of Plastic and Cosmetic Surgery is undeniable and yet the literature on the subject is scanty and widely scattered. His object is to place before the profession a precise treatise on these subjects.

The headings of the chapters are as follows: I. Historical; II. Requirements for Operating; III. Requirements During Operation; IV. Preferred Antiseptics; V. Wound Dressings; VI. Secondary Antisepsis; VII. Anesthetics; VIII. Principles of Plastic Surgery; IX. Blepharoplasty; X. Otoplasty; XI. Cheiloplasty; XII. Stomatoplasty; XIII. Meloplasty; XIV. Subcutaneous Hydrocarbon Protheses; XV. Rhinoplasty; XVI. Cosmetic Rhinoplasty; XVII. Electrolysis in Dermatology; XVIII. Case Recording Methods.

One or two quotations taken at random may be of interest. "Lately a product under the name of antiphlogistin has been used locally (in erysipelatous infection) with excellent results

and its use is to be commended even in local wound inflammation." "Unfortunately, these flaps (whole thickness), if they thrive, contract, leaving uncovered spaces, which must be treated separately or allowed to granulate."

The author has undoubtedly done a considerable service by collecting the literature and classifying it, but it is unfortunate that none of the references are given, although there are seven pages taken up by an index of the names of the authors quoted.

Several admirable original procedures are given and the case recording methods, especially by the making of plaster casts, are of interest.

Considering the object of the book the section on skin grafting is rather disappointing. The most exhaustive chapters are those on Hydrocarbon, Protheses and Rhinoplasty.

The volume is nicely gotten up and the illustrations are excellent. The book will be of especial use for reference in comparing the relative values of the plastic operations performed by different surgeons. J. S. D.

BOOKS RECEIVED.

Collected Papers by the Staff of St. Mary's Hospital, Mayo Clinic, Rochester, Minnesota, 1905-1909. 8°. 668 pages. 1911. W. B. Saunders Company, Philadelphia and London.

Differential Diagnosis. Presented through an Analysis of 383 Cases. By Richard C. Cabot, M. D. Profusely Illustrated. 1911. 8vo. 753 pages. W. B. Saunders Company, Philadelphia and London.

The Blues (Splanchnic Neurasthenia), Causes and Cure. By Albert Abrams, A. M., M. D. (Heidelberg), F. R. M. S. Fourth edition, revised and enlarged. Illustrated. E. B. Treat and Company, New York.

Inebriety. A Clinical Treatise on the Etiology, Symptomatology, Neurosis, Psychosis and Treatment and the Medico Legal Relations. By T. D. Crothers, M. D. 1911. 8vo. 365 pages. Harvey Publishing Company, Cincinnati, Ohio.

Oxford Medical Publications. Text Book of Massage. By L. L. Despard. 1911. 8vo. 290 pages. Henry Frowde, London; Hodder & Stoughton, London.

Oxford Medical Publications. Handbook of the Surgery of the Kidneys. By W. Bruce Clarke, M. A., M. B. (Oxon.), F. R. C. S. With 5 plates and 50 illustrations in the text. 1911. 8vo. 199 pages. Henry Frowde, London; Hodder & Stoughton, London.

Oxford Medical Publications. Introduction to Practical Organic Chemistry. Including Qualitative and Quantitative Analysis and Preparations, with a Special Appendix on the London University Syllabus, and Schemes of Analysis for Stages 1 and 2 of the Board of Education Syllabus. By A. M. Kellas, B. Sc. (Lond.), Ph. D. (Heidelberg). 1910. 8vo. 204 pages. Henry Frowde, London; Hodder & Stoughton, London.

A Text-Book of Gynæcological Surgery. By Comyns Berkeley, M. A., M. D., B. C. Cantab., F. R. C. P. Lond., M. R. C. S., Eng. and Victor Bonney, M. S., M. D., B. Sc. Lond., F. R. C. S. Eng., M. R. C. P. Lond. With 392 figures in the text from drawings by Victor Bonney, and 16 colored plates. 1911. 8vo. 720 pages. Funk and Wagnalls Company, New York.

Manual of Cystoscopy. By J. Bentley Squier, M. D., and Henry G. Bugbee, M. D. 1911. 12°. 117 pages. Paul B. Hoeber, New York.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by Hobart Amory Hare, M. D. Assisted by Leighton F. Appleman, M. D., Volume I. March, 1911. 8vo. 355 pages. Lea & Febiger, Philadelphia and New York.

Die akute Leukämie. Von Dr. Albert Herz. 1911. 8vo. 184 pages. Franz Deuticke, Leipzig und Wien.

Diseases of the Nose, Throat and Ear. Medical and Surgical. By William Lincoln Ballenger, M. D. Third edition, revised and enlarged. Illustrated with 506 engravings and 22 plates. 1911. 8vo. 983 pages. Lea & Febiger, Philadelphia and New York.

Oxford Medical Publications. Cholera and Its Treatment. By Leonard Rogers, M. D., F. R. C. P., F. R. C. S., B. S., I. M. S. 1911. 8vo. 236 pages. Henry Frowde, London; Hodder & Stoughton, London.

Das Radium in der Biologie und Medizin. Von E. S. London. Mit 20 Abbildungen im Text. 1911. 8vo. 199 pages. Akademische Verlagsgesellschaft m. b. H., Leipzig.

Medico-Chirurgical College. Contributions from the Department of Neurology and the Laboratory of Neuropathology for the Years 1908-9-10. (Reprints) Volume I. [1911.] 4to. Philadelphia.

Vicious Circles in Disease. By Jamieson B. Hurry, M. A., M. D. (Cantab.). With illustrations. 1911. 8vo. 186 pages. P. Blakiston's Son & Co., Philadelphia.

Bulletin of Iowa Institutions. (Under the Board of Control). Published Quarterly. Volume XII, 1910.

International Clinics. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles. Edited by Henry W. Cattell, A. M., M. D. Twenty-first Series, Volume I. 1911. 8vo. 300 pages. J. B. Lippincott Company, Philadelphia and London.

The Treatment of Syphilis with Salvarsan. By Sanitätsrat Dr. Wilhelm Wechselmann. With an Introduction by Professor Dr. Paul Ehrlich, Only authorized translation by Abr. L. Wolbarst, M. D. With 15 textual figures and 16 colored illustrations. [1911]. 4to. 175 pages. Rebman Company, New York; Rebman Limited, London.

Medical Annual. A Year Book of Treatment and Practitioner's Index. Twenty-ninth Year, 1911. 8vo. 991 pages. John Wright & Sons, Ltd., Bristol; Simpkin, Marshall, Hamilton, Kent & Co., Ltd., London.

Prevention of Infectious Diseases. By Alvah H. Doty, M. D. 1911. 12mo. 281 pages. D. Appleton and Company, New York and London.

Oxford Medical Publications. A Manual of Practical Inorganic Chemistry. Including Preparations and Quantitative Analysis with the Rudiments of Gas Analysis, etc. By A. M. Kellas, B. Sc. (Lond.), Ph. D. Heidelberg. 1910. 8vo. 347 pages. Henry Frowde, London; Hodder & Stoughton, London.

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